Chemical Week

June 29, 1957

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Process water shortage ahead? Could be—but multibillion-dollar projects should stave it off . p. 21

Germany's Ziegler: His ethylene polymerization discoveries get first full-scale U.S. tryout . . p. 28

Market analysts' biggest worry: prospects for promotion. Here are the details . . . . . p. 48

Help workers watch waistlines, and you'll improve their morale. That's what Spencer did. . . p. 52

Maintenance training is speeded at Du Pont through use of new lesson-plan technique . . . p. 64

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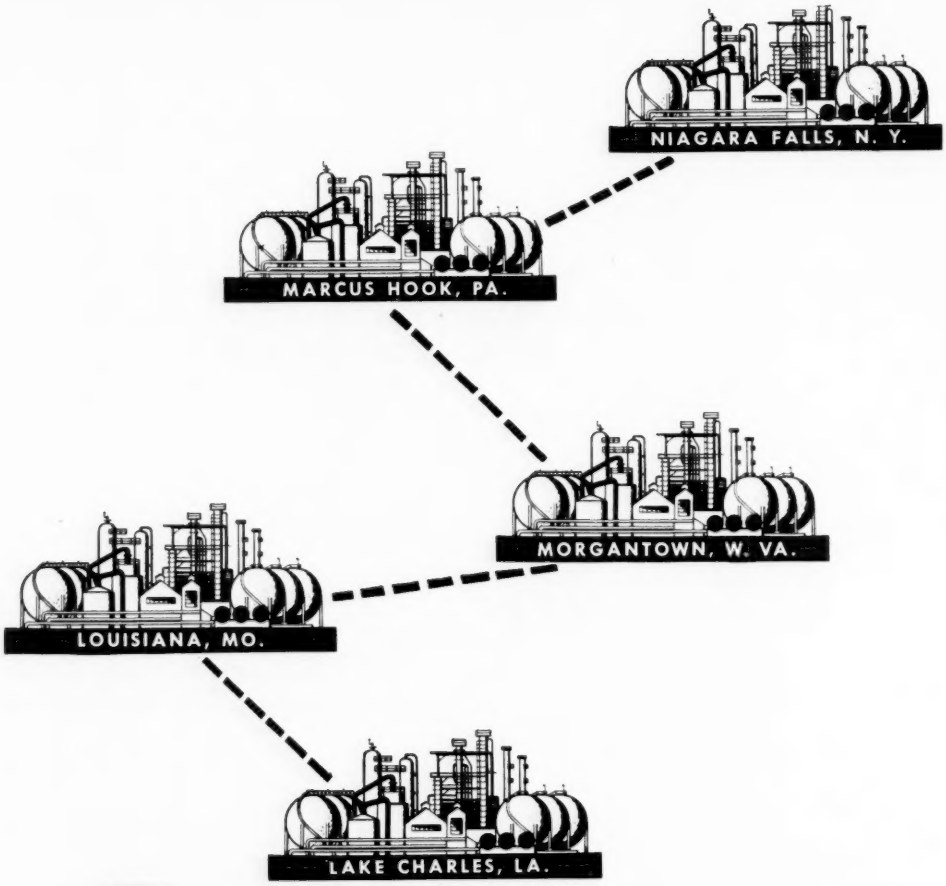

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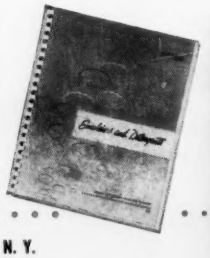

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Chemical Week

TOP OF THE WEEK

June 29, 1957

- **Research on cancer drugs shifts into high gear;** here are the avenues that are being explored .....p. 72
- **British cut imports on many chemicals** because of increasing domestic production .....p. 80
- **New metal-cladding process may find application** in printed circuitry and electrotyping, in addition to use on mirrors and ornamental ware .....p. 92

6 BEHIND THE NEWS
Why CW is starting a new department, Engineering.

12 MEETINGS

17 BUSINESS NEWSLETTER

21 Process firms will use 17 billion gal. of water/day by 1975; here's what's being done to assure those supplies.

24 What is a coal-tar color? FDA and Hoffmann-La Roche have differing opinions on Roche's beta carotene.

Firms looking for overseas plant locations are eyeing Austria's available plants.

25 Near-future prospects for industry are pictured by DCAT panelists.

28 ENGINEERING
CW's new department highlights startup of first Ziegler polyethylene plant in U.S.

36 Need for new handling equipment for liquid helium stressed at West Coast symposium.

43 WASHINGTON NEWSLETTER

44 CHARTING BUSINESS

48 SALES
New CW survey profiles the market analyst. Here's how his salary, education and background shape up.

52 ADMINISTRATION
Health education—in yearly doses—is popular part of Spencer Chemical's industrial relations program.

54 Patent Office logjam dwindles slightly, but it's still a costly blockade for process industries.

56 Higher wages in soap, detergent plants are at issue in current U.S. Labor Dept. proceedings.

61 TECHNOLOGY NEWSLETTER

64 PRODUCTION
Du Pont lesson-plan maintenance training makes study easier, helps gear maintenance for automation.

68 Parke, Davis speeds urgent communiques to hard-to-reach plant personnel with pocket-size page system.

72 RESEARCH
Here's how the cancer chemotherapy drug search looks now—and the various routes that research may take.

80 MARKETS
Britain cuts down on imports, as its industry becomes more self-sufficient.

87 MARKET NEWSLETTER

92 SPECIALTIES
Inexpensive copper and silver cladding process makes its bow. Target: use in printed circuits, electrotypes and ornamental ware.

96 Two admen and an afghan build a $1-million specialties business.

Vol. 80
No. 26

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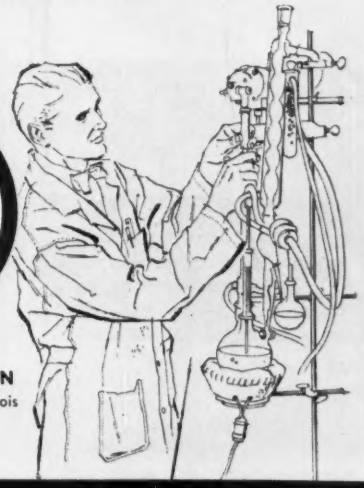

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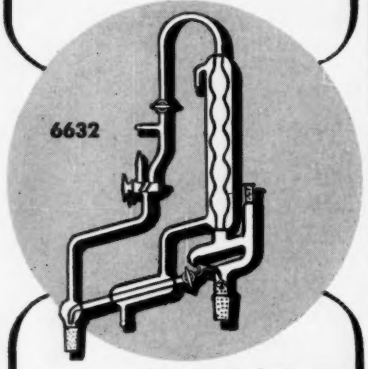

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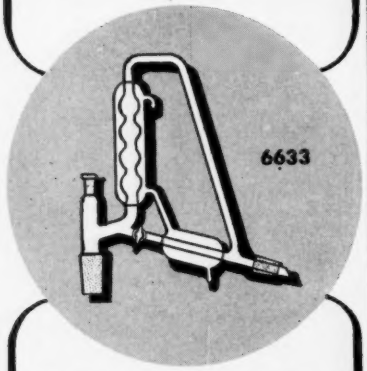

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Building on a Broader Base

You may be a bit puzzled when you get to page 28 in this issue: you'll find a new department called Engineering. I'd like to tell you a little of the thinking that brought about this innovation.

First of all, let me define CHEMICAL WEEK's editorial objective: it is to serve the management man in the chemical process industries—whether or not he is technically trained and whatever his sector of responsibility in the three broad categories of industrial functions: administrative, commercial and technical. CHEMICAL WEEK has always served all three; but since these industries rest on a technological base, we feel that additional emphasis might well be placed on the technical aspects.

Accordingly, the Production department has been split into two departments—Engineering and Production. The former will deal with news about process research and development, design, and construction. The latter will concern itself with newsworthy developments in plant management, process equipment, maintenance, instrumentation, and other areas of plant operation.

You will recognize that this is no radical departure for *CW*. All of these subjects have been covered before. But now, they will receive more extensive treatment.

These two departments, together with Research (covering research management, chemical research and development, laboratory equipment, new products from the laboratories) and Technology Newsletter, are under the over-all supervision of Donald Burke, associate editor for Technology, one of the founding editors of CHEMICAL WEEK. His qualifications include a B.S. in chemistry and mathematics from St. Peter's College, graduate work in chemical engineering and industrial management at Stevens Institute of Technology, and industrial experience in control and process development.

Engineering Editor Kenneth Wilsey is a B.Ch.E. from Syracuse, has 4 years' experience as a process engineer with General Motors and 4 years as a technical-service engineer with Oakite Products. He came to us more than three years ago, was assistant editor in Production, and has been Production editor since Jan. '56.

Production Editor Herbert Short is a B.Ch.E. from Penn State. He joined *CW* in April '56, as assistant Production editor, after 6 years as a process engineer with the international division of Colgate-Palmolive. There, he was liaison between foreign superintendents and U. S. management.

Understudying Ken and Herb is Assistant Editor Philip Untersee, a new addition to the staff and a brand-new M.S. in industrial management from Massachusetts Institute of Technology. Two years ago, MIT granted him a B.S. in chemistry, and he has had summer experience in research (at MIT) and in production-control engineering (at Du Pont's Belle Works).

These men, backed by *CW*'s 25 full-time editors, as well as our news bureaus and correspondents, will do their best, week after week, to make technical news more meaningful to you as management men. And as always, we welcome your comments on how we can serve you better.

HOWARD C. E. JOHNSON
EDITOR-IN-CHIEF

Limited to Six

TO THE EDITOR: . . . I was quite surprised to see the article (*May 18, p. 16*) regarding European chemical production, which omitted Belgium from the European scene other than a very brief mention of it in the second paragraph with respect to tariff barriers. This may be taken by some Belgians as an oversight, whereas others might regard it as somewhat of an in-

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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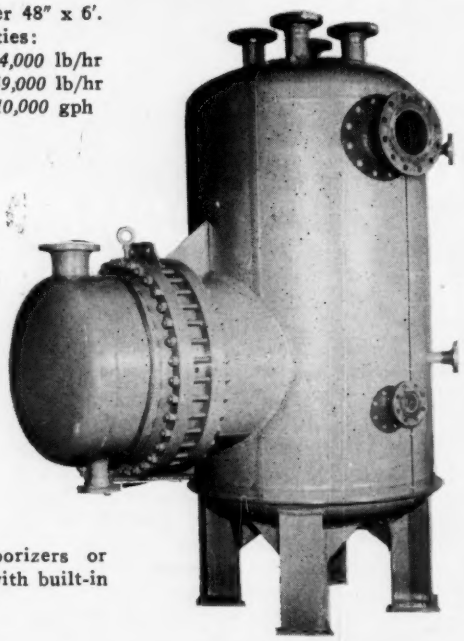

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OPINION

sult, as Belgium is a strong factor in the chemical market in Europe. Even Luxemburg should be shown on the map, even if its chemical production is small or even nonexistent.

. . . Six years ago I visited a large Belgian chemical plant in the southwest part of the country that by-product cokes 3,000 tons of coal a day, has a very substantial synthetic ammonia plant, and makes a large line of coal-based chemicals.

Even if the chemical production of Belgium is not as great as other countries, it is a factor and should certainly be recognized in an article of this sort. . . .

ELWOOD LAYFIELD
Vice-President
The Ralph M. Parsons Co.
Los Angeles

Belgium and Luxemburg certainly would be included in a comprehensive roundup. We limited this story, as we said, to reports from "CW correspondents in capitals of six key chemicals-producing countries. . ." — ED.

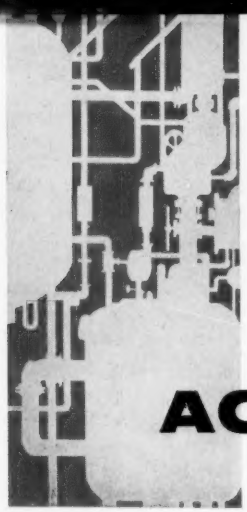
Dry Cleaning Doesn't Wear

TO THE EDITOR: We would like to add our nickel's worth to Dr. Wiebush's letter, which in turn refers to your article "Newest Target: Clothes" (*March 23*).

In the first place, Dr. Wiebush is correct, as our own research indicates —dry cleaning is *not* hard on clothes. Since tensile strength of wool tends to increase in dry cleaning we might say woolens actually are strengthened. But that is another subject.

What we really wonder about is the caliber of the expert who told you that preliminary "spotting" and subsequent ironing do contribute to wear. Let's take the last first.

Although it is true a special iron is used on some parts of some dresses and also on a few linings, cleaners by and large do not iron, and it is seldom if ever referred to in that terminology. Cleaners press or finish, and the people are called pressers or finishers and the equipment involves well-padded presses using air and vacuum. Even in laundries the practice of sliding some sort of pressing device over a surface is avoided almost completely—so there can be *no* rubbing friction and, hence, wear from that source. Besides, even in the extremely small number of cases where true ironing is needed, I'll wager



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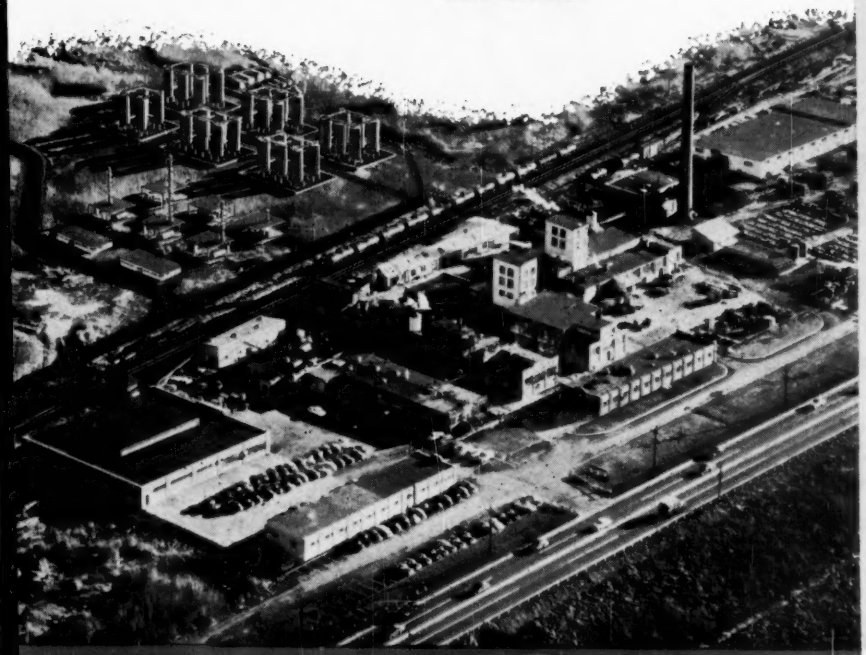

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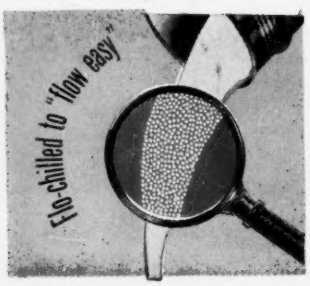

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that kind of rubbing would have to persist hours upon end to equal the effect of even one day of normal wear.

In the second place, this so-called preliminary spotting, or any spotting that is needed to remove the ravages of careless wear, is applied only to a relatively small number of garments, and then only because wear has created a mess that, if not removed immediately, would damage fabrics beyond recall, assuming that such has not already occurred. Certainly, the gentle treatment needed to remove underarm perspiration is far less severe than the already deleterious effects of that soil. A skilled spotter does not rub spots, and he uses mild reagents. Except in those instances where the spot is really bad, he has few tough problems. But when an amateur painter gets more on his breeches than on the wall, the spotter must work with more vim than normal. In my opinion, however, it can be argued that in such a case, wear has contributed more to the situation than any dry cleaner.

Finally, dry cleaners, as might be expected, clean their own clothes frequently, sometimes after every wearing. Their experience taught me long ago that cleaning is not hard on clothes.

LESTER E. FRANCIS
Director of Advertising
Emery Industries, Inc.
Cincinnati, O.

No Offense Meant

TO THE EDITOR: The article titled "How to Size Up the Productive Researcher" *(May 25)* is well done, but why on earth is it necessary to caricature the productive researcher as an imbecile? It is understandable that an artist may be jealous of his creative colleague, the scientist, but I can see no justification for belittling the productive researcher. . . .

JULES D. PORSCHE
Staff Assistant to Vice-President
Research Division
Armour and Co.
Chicago

TO THE EDITOR: I find the cartoon *(May 25)* most offensive. Too many people in management already consider the researcher in some inferior category, because they do not understand

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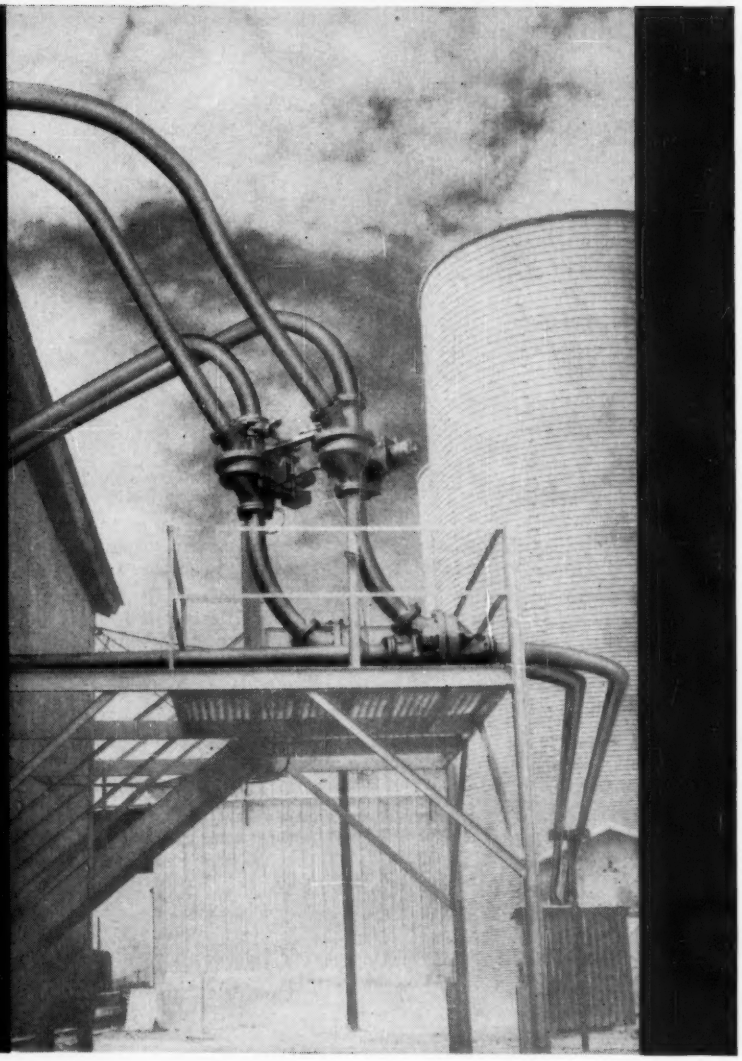

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OPINION

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Certainly no belittling was intended. This simply was the cartoonist's individual style. — ED.

MEETINGS

American Assn. of Cost Engineers, 1st annual meeting, University of New Hampshire, Durham, June 26-29.

British Plastics Exhibition and Convention, Olympia London Grand & National Halls, London, July 10-20.

Denver Research Institute, Metallurgy Division, 6th annual conference on industrial applications of X-ray analysis, Albany Hotel, Denver, Aug. 7-9.

American Soybean Assn. and National Soybean Processors Assn., annual meeting, Leamington Hotel, Minneapolis, Aug. 26-28.

Fisk University, 8th annual infrared spectroscopy institute, Nashville, Aug. 26-30.

Instrument Society of America, international symposium on gas chromatography, Kellogg Center for Continuing Education, East Lansing, Mich., Aug. 28-30.

National Agricultural Chemicals Assn., annual meeting, The Essex and Sussex, Spring Lake, N.J., Sept. 4-6.

Instrument Society of America, 12th annual instrument automation conference and exhibit, Auditorium, Cleveland, Sept. 9-13.

Technical Assn. of the Pulp and Paper Industry, testing conference, Hotel Shoreham, Washington, Sept. 11-13.

International Union of Leather Chemists Societies, 5th conference, Rome, Italy, Sept. 15-20.

National Bureau of Standards, free-radicals symposium, Washington, Sept. 18-20.

Drug, Chemical and Allied Trades Section of the New York Board of Trade, 67th annual meeting, Galen Hall, Wernersville, Pa., Sept. 19-21.

American Oil Chemists' Society, fall meeting, Netherland Hilton Hotel, Cincinnati, Sept. 30-Oct. 2.

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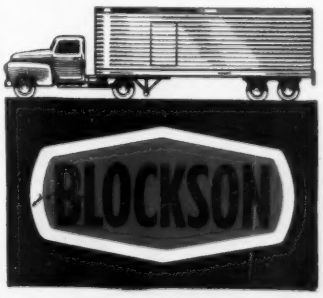

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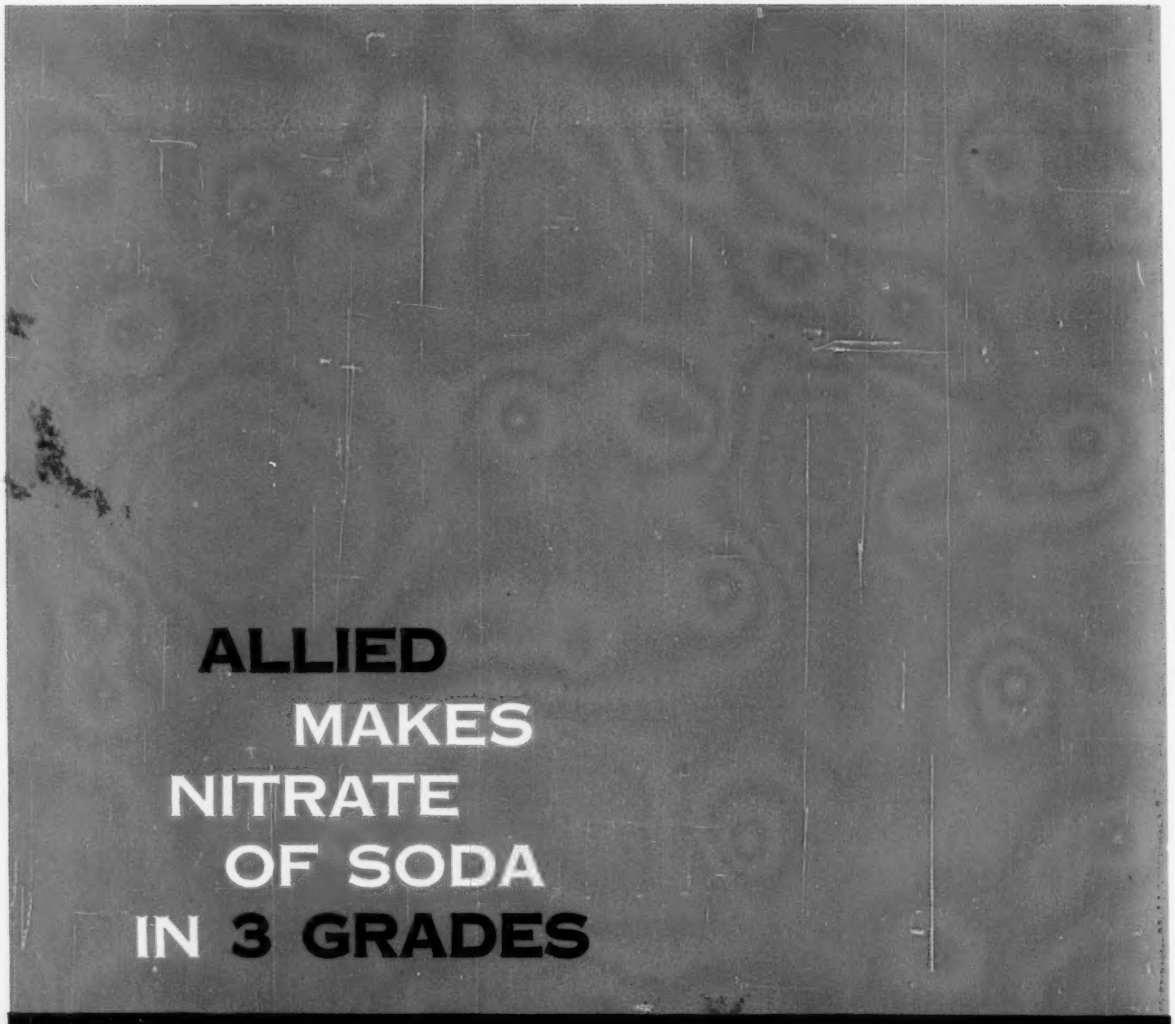

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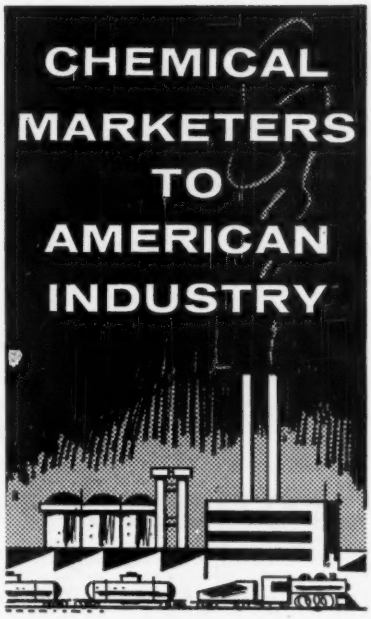

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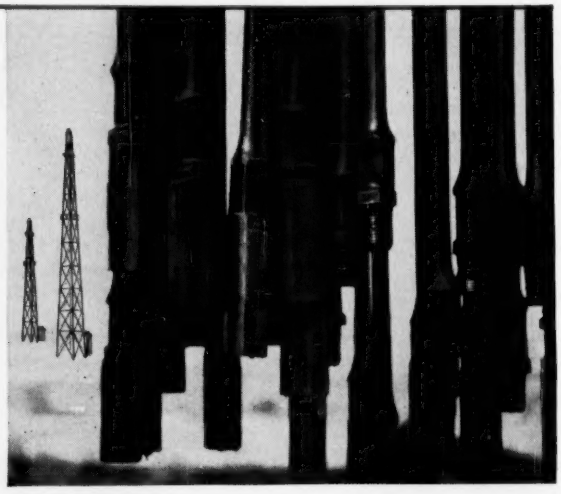

See those rod joints and couplings in the picture at right? They have just been pulled out of an oil well. And they're ready for the junk pile . . . because corrosion by acids and oxygen in the well fluids has caused severe pitting and weakening of metal.

Corrosion costs oil producers millions of dollars yearly. The direct costs, for replacement of tubing and rods, are heavy. And the indirect costs can be even more serious . . . for every time you pull well rods or tubing for replacement, you lose production that you may never regain.

The Aquaness Department of Atlas, specialists in chemicals for the oil industry, is putting Atlas' knowledge of surfactant chemistry to work in the war against corrosion. They have developed a series of CRONOX inhibitors, which form a tough protective film on metal. A complete range of these inhibitors is available to meet the varied requirements of different kinds of wells. And Aquaness field men, who have long experience in the oil fields, are thoroughly qualified to recommend the best CRONOX inhibitor and method of treatment for each situation.

If you're in the oil business, you'll find a lot to interest you in the new booklet describing CRONOX inhibitors. Write to us for a copy. If you want the facts on corrosion in your own wells, let an Aquaness field representative conduct a corrosion survey for you, at no obligation.

Making cleaners for military use?

Laundering millions of uniforms, and cleaning hundreds of different kinds of military gear from airplanes to barracks walls, calls for a lot of special kinds of detergent action. For each application, the armed forces have established definite specifications for performance.

If you're interested in making military cleaners, we can probably lend you a hand. Our RENEX® series of detergents gives you a broad range of properties from which to select the combination that fits the specifications to which you're formulating. From our Development staff, we have accumulated considerable data on how to use this family of materials in specific military applications.

Write to us about your particular problem. There's a good chance we already have the answer you're looking for.

Tips on formulating soap-free silicone creams

The water-repellent and low surface tension properties of silicones have caused considerable interest in their use by cosmetic chemists. Among valuable applications are creams which prevent sensitive skin from being irritated by detergents or hard water.

As part of the Atlas program for helping cosmetic chemists to save lab time and costs in new product formulation, we have issued a bulletin that gives some of the "how's and why's" on formulating silicone hand creams without common soap-type emulsifiers, which are sometimes irritating in themselves. Included is a guide formula to get your research off to a fast start, showing how to adapt Atlas non-ionic emulsifiers, and how to use SORBO® sorbitol solution for superior moisture protection and emolliency.

Write for a copy on your company letterhead. Ask for CD-109.

Business
Newsletter

CHEMICAL WEEK
June 29, 1957

The rising importance of noncellulosic synthetic fibers—often at the expense of cellulosics—is underlined by Du Pont's study of the feasibility of building a Dacron manufacturing plant adjacent to its rayon works in Old Hickory, Tenn. Whether it will go ahead with the plant (and a dimethyl terephthalate unit), Du Pont emphasizes, depends on a year-long study of the synthetic fiber situation. The study should be completed in the first half of next year. Meantime, orders for materials involving long-term delivery have been placed, subject to cancellation.

Du Pont has already started to supplement operations at one rayon plant with one for a noncellulosic fiber. At its Spruance works in Richmond, Va., Du Pont last fall began building a 40-million-lbs./year nylon tire cord facility. The Richmond plant should be onstream early next year. If Du Pont decides to produce Dacron at Old Hickory next year, the plant would likely be ready no earlier than 1959.

And by the end of '58, American Enka will boost nylon capacity by 75%. Enka is putting $5 million into the new facility, which is designed to produce fine denier textile yarns. Construction on the new plant will likely start this month.

Synthetic fibers are making news abroad, too. Chemstrand, which concluded an agreement with an Italian firm a few months ago to produce its acrylic fiber in Italy, last week signed up Mitsubishi Rayon Co. to produce similar fiber in Japan through a jointly owned firm, Shinko Acrylic Fiber Co. (Mitsubishi Chemical Industries may also participate in this company.) Planned is a 7.5-million-lbs./year plant (capacity can be doubled later), scheduled for production in '59. Output will not be sold under the Acrilan tradename.

Russia, too, may raise its synthetic fiber output. Krupp (Essen, Germany) has received a Russian order to establish a $4-million synthetic fiber plant. (Just what fiber is involved has not been revealed, although it is said to be based on dimethyl terephthalate, as in Du Pont's Dacron.)

•

Should Mexico nationalize its sulfur industry as it did its oil industry 20 years ago? One voice advocating such a move was raised this week when Eduardo Fernandez, leader of the Mexican sulfur workers union, said the union would ask that the Mexican government nationalize.

•

France has followed Britain's lead in relaxing trade barriers with Red China (*CW, June 22, p. 59*). It has added such products as silicon carbide abrasives, marine paints, calcium carbide, phosphorus, sodium cyanide, vinyl resins, chlorates and perchlorates to its list of exportables—but it has a problem: chances are buyers in China will

seek immediate delivery, and France's present production of such items is already committed. One possibility is that production facilities will be increased to handle the new business if it appears to be substantial.

•

France's move was but the first of many. By late last week, Italy and western Germany had also decided to relax restrictions.

•

New bids to buy the magnesium plant at Painesville, O. are now being accepted by the government. Bids previously submitted by Kaiser Aluminum & Chemical Corp. and Wheeler Chemical Corp. for the 36-million lbs./year plant (*CW Business Newsletter, May 25*) were turned down by the General Services Administration's Chicago office in the 60-day period in which it had to consider them.

Sealed bids submitted in this reoffering will be opened by GSA on July 23.

•

Jefferson Chemical will take over the caustic soda sales of American Cyanamid July 1. Jefferson has set up a new division headed by ex-American Cyanamid man William Phillips to market the supplies. Actual production of caustic by Jefferson won't begin until late '58, when the firm's chlorine plant in Port Neches, Tex., is due onstream. Jefferson is equally owned by American Cyanamid and The Texas Co.

Southern Minerals, another American Cyanamid joint interest —Pittsburgh Plate Glass owns the rest (51%) of this firm—is exploring the possibilities of producing uranium from deposits it has near Corpus Christi, Tex. Southern, a supplier of crude oil and gas, purchased the property strictly for its uranium values, but has not yet decided definitely on whether or not it will go into commercial production.

•

Du Pont will double its high-pressure polyethylene capacity as part of its 1957 $200-million expansion plans, according to H. H. Hopkins, company treasurer. There's also expansion due this year in Dacron, Orlon and nylon output. New products slated for particular attention this year include Delrin polyformaldehyde plastic, which will probably be put in commercial production, low-pressure polyethylene—Du Pont has a Ziegler license (*see also p. 28*)—amino acids for feeds, and isocyanates.

•

What's the potential market for latex-based exterior housepaint? Monsanto's Russ Green told West Coast chemical researchers that there's a market for 30 million gal./year. And that could mean a tidy demand for paint raw materials—an estimated 75 million lbs. of titanium dioxide, 3 million lbs. of dispersing agents, 1.5 million lbs. of mildewcide, 5-6 million lbs. of defoaming agents per year when used in a latex base such as Monsanto's acrylic-containing Lytron 680 or Rohm & Haas' Rhoplex AC-33.

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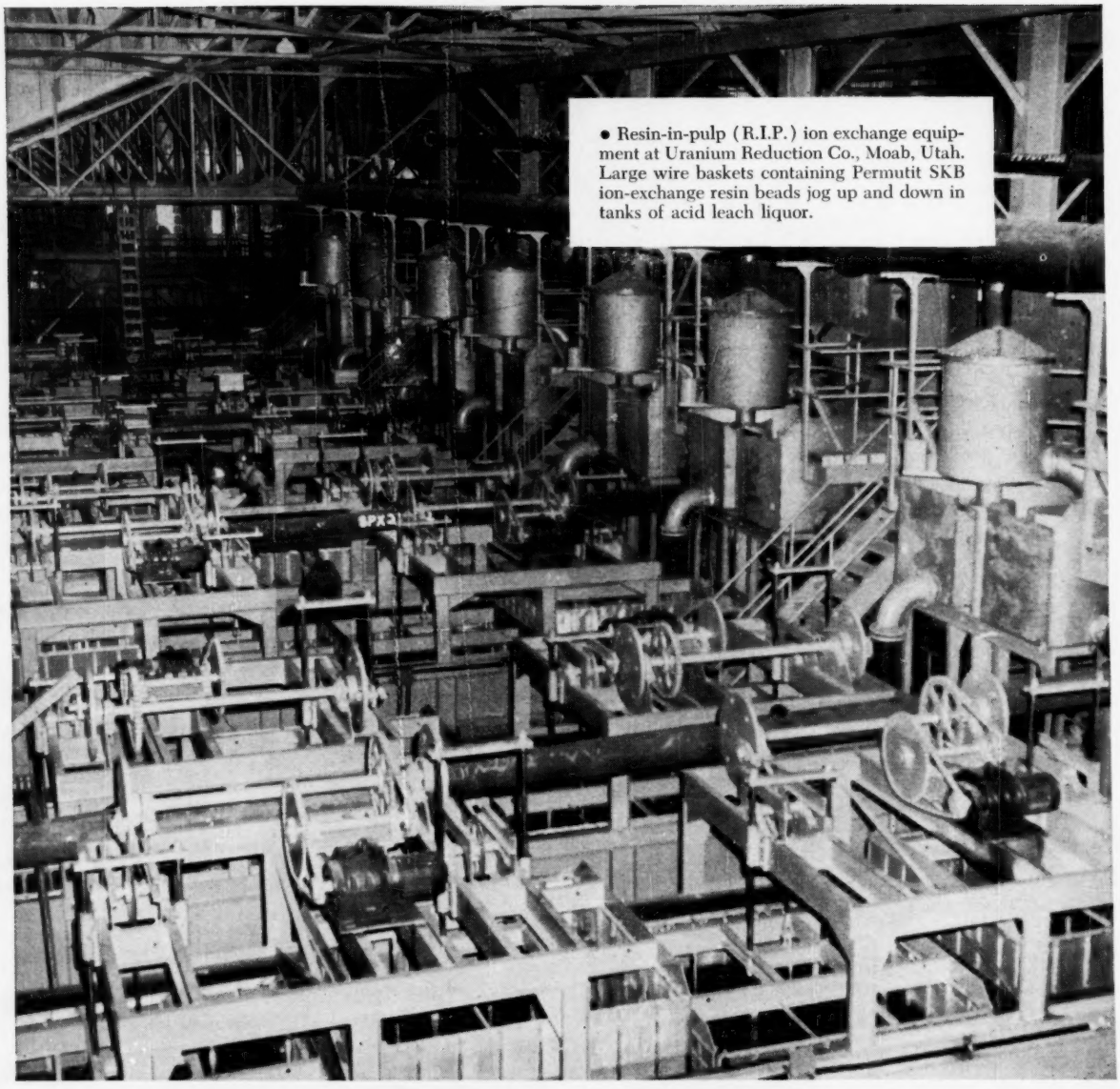

• Resin-in-pulp (R.I.P.) ion exchange equipment at Uranium Reduction Co., Moab, Utah. Large wire baskets containing Permutit SKB ion-exchange resin beads jog up and down in tanks of acid leach liquor.

Uranium Reduction Co. boosts output with Permutit SKB resin

• Uranium Reduction's mill is built around the R.I.P. process, and their engineers constantly look for better ion exchange resins.

After Uranium Reduction started using Permutit SKB resin, they reported higher plant output . . . with no noticeable loss in uranium recovery.

Permutit SKB is used in a number of R.I.P. mills for these same reasons. It was developed especially for R.I.P. uranium extraction. It disperses well, preventing "blinding" of the baskets and improving resin-pulp contact. Its unique chemical structure gives it fast loading for high uranium recovery, high capacity and fast elution. This results in extremely high concentrations of recovered uranium particularly in nitrate elution systems. It also means low precipitation costs and a high purity uranium.

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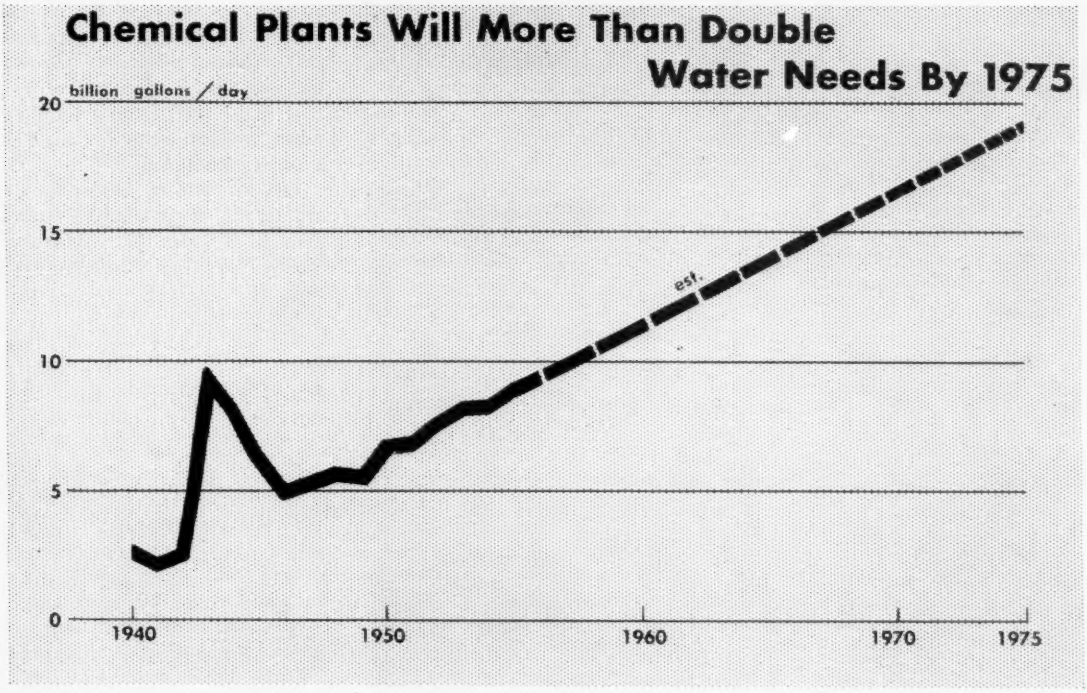


Process Plants Plan for Future Water Needs

Finding precious process water for chemical plants—already an acute problem in some areas—will probably grow more difficult in the next dozen years or so. That's the outlook arising from figures in a report currently being compiled by the U.S. Dept. of Commerce.

The chemical industry, says a Commerce official working on the report, "will at least double, perhaps triple, its water needs by 1975." This means the industry will be using a minimum of 19 billion gal./day within the next two decades—possibly more if the industry continues to grow at the rate it has set in the postwar years. Of the total, 90% is destined to be used by major plants using 20 million gal./year or more.

To determine what's being done by chemical firms to secure adequate water sites for themselves, *CW* queried some 50 chemical companies throughout the U.S. Though none—with the exception of those firms situated near industrially saturated areas—feels there is any serious supply problem now, there is a growing concern about needs for future expansion.

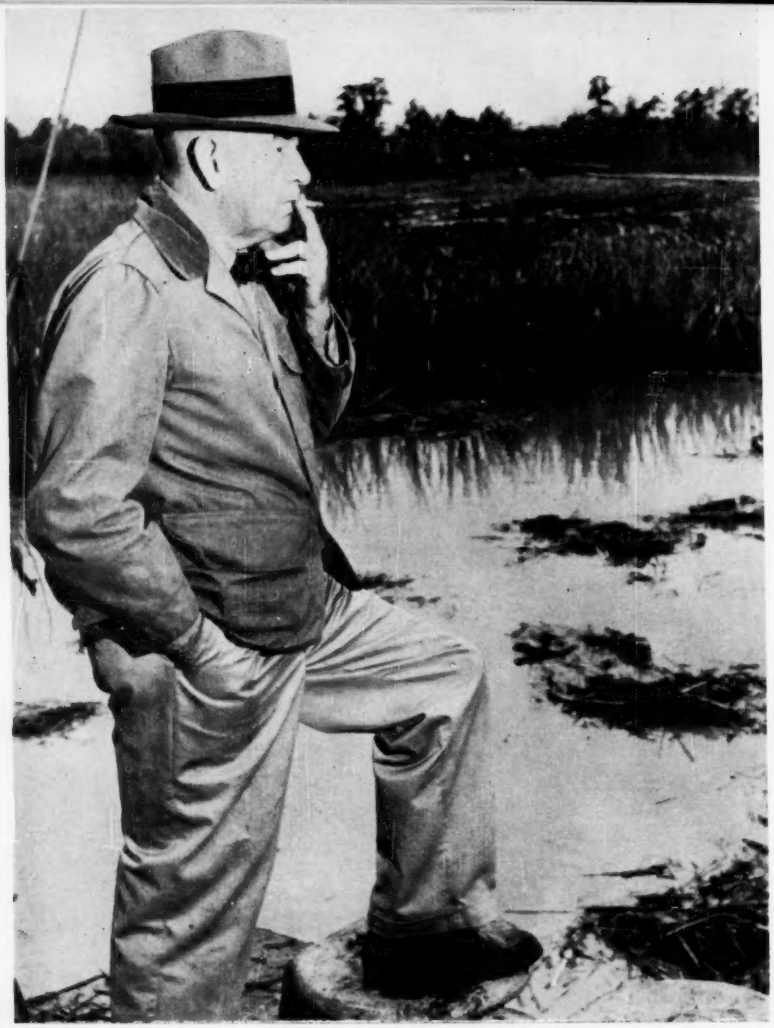
Needs Vary: Water needs, the companies carefully point out, vary widely within the industry and in different sections of the country. The postwar trend has been to locate big water-using plants away from densely populated areas, where there's less drain on available supplies. Many firms are doing—indeed, have already done—this. For example, companies such as Alcoa and Reynolds, which require approximately 320,000 gal. of water to produce one ton of aluminum, had made an effort to preclude shortage problems by putting major plants in relatively unpopulated regions such as upstate New York, Vancouver, Wash., Sheffield, Ala., and Hurricane Creek, Ark.

Fight for Sites: But some process firm can't do this.

The nearness to markets, raw materials supplies and available labor must also be considered. Thus, many firms must locate in highly industrialized areas, where they are faced with pollution problems as well as large daily water requirements. In such cases, industrial sites with good water supplies are at a premium.

To meet this extremity, some chemical companies are snapping up choice sites, even when no specific plans for them have been drawn. This practice, though not widespread, may increase, chiefly among firms making only one type of product, such as paper or polyethylene; they can forecast what kind of site they'll need for expansion. Pacific Coast Borax, for example, recently bought a large site near Boron, Calif., chiefly, the firm says, because of its water supply.

Not for Some: Highly diversified firms don't go in for such site-stockpiling tactics because they're not certain what kind of plant they'll build



Engineer Arthur Field studies $4.5-million Bushy Park area.

Park was formed by joining Back (left) and Cooper rivers by canal.

next. Says Du Pont, "We never buy a site unless we have a pretty good idea what we'll use it for, never just because it has a good water supply. There are too many other factors involved." Another viewpoint is expressed by Shepherd Powell, industrial water consultant. Says Powell, "Sure, some companies are buying up good water sites without any specific plans for building on them. I might even buy some myself. They're a good investment."

Digging Down: Some companies are tapping underground water supplies. S. K. Love, chief of the water branch of the U.S. Geological Survey, says, "It is safe to say that ground water reserves in the U.S. are sufficient for greatly increased use of this resource. . . . the present total ground water withdrawal in the U.S. amounts to only a small fraction of the potential." (About 10% of all water used by chemical plants is from this source.) However, he points out that there are hazards for companies relying too heavily on deep wells. Underground water levels rise and fall with wet and dry years, and highly industrialized areas must guard against overdependence on this source.

Fresh From Salt: Probably the brightest prospect for eventually solving water supply problem is the age-old dream of an inexhaustible water supply by desalting ocean water. Indeed, says the Commerce Dept., lessened salinity would make water usable for many purposes: one third of that now used is brackish to some degree.

The Dept. of Interior's saline water project may soon produce workable results. "Promising" is a key word, however, in this area, despite expanded efforts by some 50 U. S. laboratories, and workers in at least a dozen foreign countries. Difficulties in desalinization stem not only from the complexity of the physical process involved in reducing water's salinity but also in performing this trick at costs that water users—industrial, agricultural or municipal—are able or willing to pay. Workers on the project are almost unanimous in the view that they'll eventually solve the problem, but they warn that crash-program results cannot be expected on a $2-million/year budget.

Most optimistic is Secretary of the Interior Fred Seaton, who recently

asserted (*CW Washington Newsletter, March 16*) that commercial economic desalting units should become a reality in the "not too distant future."

Other Approaches: Meanwhile, state governments are taking steps to alleviate shortages in their areas by other means. Many are diverting rivers, building huge aqueduct networks, pipelines, erecting dams and appropriating large sums for treatment plants (*see table*). Most, however, are still in the planning stage.

A major effort that is concerned primarily with industrial water supplies is Charleston, S. C.'s $4.5-million Bushy Park project, which is supplying 10 billion gal./day of additional water for its local industry. A lucky freak of geography made the project possible, but it took the vision of Arthur Maxwell Field, an industrial engineer on Charleston's Industrial Development Board, to visualize the possibilities.

Flying over the area one day, Field got his idea. Since the Back River rises two miles west of the Santee-Cooper River and flows parallel with it for seven miles before veering off east and joining it, a canal dug upstream could connect the two rivers. Thus, fresh water from the upper Santee-Cooper could be diverted to the Back River. A dam at the lower end of the Back River would hold out sea water. By reshuffling these two rivers, Charleston could get a large new fresh-water supply, and open up the tract of land between the two rivers, known as Bushy Park, for industrial sites. Charleston city fathers bought the idea.

Now, Charleston's prospects for new industry are brightening. Gulf Oil Corp. has already optioned 3,000 acres near Bushy Park as the site for a large refinery, and numerous companies are seriously investigating the area.

Such water projects, together with intensified research on saline water conversion and use of ground water supplies, will all help to ward off a potential shortage. The question seems to be not one of a country-wide dwindling of resources, but rather one of distribution of available supplies. In some cases projects will be expensive. But most agree that if industry is to expand, an area's water supply may well be the clincher in deciding where plants will be built.

Major Water Projects

State—Nature of Project	Est. Cost	Target Date	Additional Water Supplied
California an aqueduct running full length of state; will carry water from well-supplied North to arid Central and Southern regions.	$12-13 billion	undet.	19.6 billion gal./day
Indiana extensive studies in all areas of state; specific projects vary; will use both surface and ground sources.	undet.	undet.	9.5 billion gal./day
Ohio will divert water from Lake Erie by means of a canal to be linked with Cayuga River. Another canal at other end of river will carry water back into Erie.	1st stage: $56 million 2nd stage: $200 million	1980 2000	1980: 2.7 billion gal./day 2000: 4.3 billion gal./day
Oklahoma a 200-mile canal, navigable, to tie in with Arkansas River Basin project.	$200 million	1972	1 billion gal./day
Texas a large canal running across entire state; will intercept flow of seven rivers and redistribute the water to arid regions.	$1.1 billion	2000	7.1 billion gal./day
Rhode Island Creation of large water district in Providence area to cover Providence and neighboring towns; will pipe surface water to different areas where treatment plants will be built.	$14.4 million	1975	61 million gal./day
New Jersey Will impound surface water and pump additional water from Delaware River, also will use some ground water.	1st stage: $170 million 2nd stage: $500-630 million	1970 2000	1st stage: 420 million gal./day 2nd stage: 1,158 million gal./day
South Carolina 3.3-mile canal diverts upstream Cooper River water into Back River; dike across Back River prevents salt water intrusion.	$4.5 million	complete	10 billion gal./day

FABIAN BACHRACH

ROCHE'S BARNEY: He's pressing for public hearings on food colors.

Bid for Reappraisal

Should a synthetic chemical coloring material that's identical to a natural food color be subjected to the same type of government certification procedures required of synthetic coal-tar colors lacking natural duplicates?

This question is at issue between Hoffmann-LaRoche and the Food & Drug Administration, following Roche's declaration last week that it would fight an FDA ruling that exempts natural carotenoids from certification, while requiring such clearance for synthetic beta-carotene, which the firm produces.

Hoffmann-LaRoche produces beta-carotene by a new synthetic process it developed last year. The synthesis, using acetone, is said to be more economical than older processes.

FDA made known its decision in a recent *Federal Register*. Now Hoffmann-LaRoche, with the company's Technical Director George Siemers and President Lawrence Barney leading the attack, says it will "vigorously oppose" the move.

Statement: In an official statement, the company said that beta-carotene "should be excluded from the definition of coal-tar colors" whether it is derived from vegetable sources or has been produced by advances in science (*CW, Jan. 26, p. 56*). Reason, it says, is that, regardless of the method of production, beta-carotene is the same. In neither case is it a coal-tar color. The company then went on to explain that it has thoroughly tested the synthetic product and found it has "no harmful effects."

Roche's view is backed up by such companies as Lilly, Pfizer, Merck, Distillation Products, Kraft Foods, Standard Brands, Best Foods and the National Assn. of Margarine Manufacturers. It is opposed by the Certified Color Industry Committee, some farm-consumer groups and a few manufacturers.

Next Move: The next move will be for Hoffmann-LaRoche to press for public hearings before an FDA examiner. This, a Roche spokesman assured *CW*, the company will do shortly. And John Harvey, FDA deputy commissioner, after reading Roche's statement, said he thought there is a case for debate in the company's answer, that the issue will likely go to a hearing.

When hearings do take place, they're likely to focus attention on the whole controversial question of possible new legislation to set tolerance levels on food colors. The matter will be handled by Rep. John Bell Williams' (D., Miss.) House Health and Science Subcommittee. And, with the added emphasis, legislation to definitely set the extent of FDA's regulatory powers, previously not given much of a chance to pass this session, may still see action on the House and Senate floors.

WIDE WORLD

REP. WILLIAMS: He may air the issues in committee.

Austrian Plant Sale

The Austrian government this week has up for sale a number of chemical enterprises formerly owned and operated by Soviet forces that occupied part of Austria. The plants are to be sold under terms of the 1955 treaty that ended the occupation.

Among the enterprises up for sale:

- Chemosan-Union AG. This company is a producer of chemicals, pharmaceuticals and cosmetic compounds. It also buys and sells chemicals and represents foreign chemical firms. Its capital amounts to $107,000, and the 1955 balance showed sales of $807,000, with a net profit of $17,680.
- Chemische Fabrik Wilhelm Neuber AG. Although originally a chemical producer, this organization is now a wholesale trader in chemicals, having sold its plant at Brunnam Gebirge during '56. In '55, sales were equivalent to $563,000, with a net profit of $22,400.
- Akkumulatorenfabrik GmbH (Liesing). This concern makes automotive storage batteries, has extensive export sales, some of it in iron curtain countries. The plant employs about 500.
- Oesterreichische HIAG Werke. This chemical manufacturing company employs about 50.
- Wirtschaftliche Forschungs-Gesellschaft m. b. H. This plant produces concentrated nitric acid.

These are the chemical units on a list totaling 36 industrial enterprises. The sale is being handled by the government-operated Verwertungsstelle der Oesterreichischen Vermoegensschutz Gesellschaft m.b.H. (Vienna). No limit has been set on the bidding level.

Apparently the government is anxious for sound foreign capital to come into the country, since bids from both Austrian and foreign investors are eligible.

The bidding period is six weeks in each case, counting from the day of announcement of sale in the official paper *Wiener Zeitung*—the bidding period for the plants above extends to the middle of July. If customers are not attracted, an extension or a reoffering at a later time is planned. The agency will issue detailed descriptions of each plant to interested parties.

DCAT members hear NAM'S Ralph Robey discuss business in '58.

Promised: Stability in '58

Early last week, in the midst of New York's presummer heat wave, some 425 shirt-sleeved members of the Drug, Chemical and Allied Trades section of the New York Board of Trade, listened intently to some of industry's outstanding leaders size up the future of their particular fields. The occasion: DCAT's third annual luncheon meeting and panel discussion in the ivy-trimmed (but un-air-conditioned) grand ballroom of the Hotel Biltmore.

On the speakers' panel: Ralph Robey, economic advisor of the National Assn. of Manufacturers; Glenn B. Miller, president of Allied Chemical & Dye; and J. Mark Hiebert, president of Sterling Drug. The program was moderated by Charles Walker, Jr., president of vanAmeringen-Haebler.

Soft Spot Worry: Speaking about business in general, NAM's Robey envisions a "plateau period" for the economy that will extend well into '58. He sees no significant upswing before then, and nothing in the immediate future "that will push us up or knock us off" the present relatively high level of business.

Among the areas he describes as "soft" are the automotive industry, textiles, pulp and paper—and "steel, too, is riding down." For autos, Robey predicts '57 will turn out to be a "below-6-million-unit year"—probably closer to 5.8 million, contrasting with an earlier anticipated 6.5-million total. Housing is another area causing some concern, with the year expected to produce less than a million housing starts.

The money market is the biggest worry, however, says Robey—not necessarily the high interest rates, but rather the problems facing the U.S. Treasury. Government expenditures are running above expectations, and interest rates have reached levels at which holders of government bonds can get more return by cashing in their bonds and investing elsewhere.

On the whole, though, Robey indicates that the weak and the strong spots in the nation's economy pretty well cancel each other out, making for a relatively stable outlook.

Chemicals Bright: Allied President Miller spelled out a fairly bright future for the chemical industry, but he noted that the past 25 years' continuing successful growth of the industry has "lured companies from other industries into the chemical orbit and further increased the strong competitive situation."

He cited the influx of petroleum, paper, rubber, electrical equipment and farm equipment manufacturers into chemical production as making it more difficult to define the boundaries of the chemical industry. It is a factor "causing some of today's temporary overcapacities," he said.

Concerning the near-term outlook, Miller said that "people in Washington" have expressed their opinion that chemical sales will rise 6% in '57 from the record of '56, part of which would be due to higher prices. "It would be good enough for our purposes if we use this rate of increase in estimating the growth of the chemical industry as a whole for the year ahead," he concluded.

Pharmaceuticals Up: Pharmaceutical sales have increased some $400 million over the past four years, and sales last year may have hit at least $1.4 billion. Growth in sales, in research expenditures, and in progress in combating the world's diseases were items underscored by Sterling Drug's Hiebert.

In '57, Hiebert expects his industry to do at least as well as in '56, "given a continued high level of national income."

Looking ahead as much as a decade, Hiebert predicts that the greatest medical advance will be in the field of viral diseases. "Also at the end of the 10-year period, we ought to have acquired considerable [additional] knowledge about the nature of cancer, multiple sclerosis, Parkinson's disease, and about the pharmacology of the steroids as they relate to the endocrine system."

Hiebert admonished the industry to "not permit our sales zeal to lower our level of behavior as drug manufacturers," despite the highly competitive nature of the business—competitive in the market, in the research laboratory, and in manufacturing techniques.

EXPANSION

Polyesters: Witco Chemical Co. is planning a new plant to make polyesters used in urethane foams. The unit, to be added to the company's Emulsol Chemical Division plant in Chicago, will more than double Witco's polyester capacity.

•

Liquid Oxygen: The Air Research and Development Command has just completed a new 150-tons a day liquid oxygen plant at Edwards Air Force Base, Calif. It will turn out about 15 tons/day of liquid nitrogen as a by-product.

•

Resins: Balfour-Guthrie & Co. (San Francisco) has started construction of a $300,000 synthetic resins plant near Tacoma, Wash. The plant will have a capacity of 50,000 lbs./day, is slated for completion early in November. Major products will be phenol-formaldehyde and urea-formaldehyde resins.

COMPANIES

Philips Electronics Inc. and A. Hollander & Son Inc., a distributor of chemical intermediates and dyestuffs, have approved plans to merge the two firms. Subject to stockholders' approval, terms call for Hollander to issue 652,951 shares in exchange for Philips stock. Hollander's 243,921 outstanding shares would remain unchanged, though it would assume Philips' name.

Shareholders in both firms will be asked to approve the proposal at special meetings set for July 25.

•

Cerro de Pasco Corp., Peruvian metallurgical firm, plans to acquire Lewin-Mathes Co. (St. Louis) is exchange for 303,905 shares of its common stock. Directors of both firms have approved the plan and stockholders will vote at a special meeting scheduled for this week.

Lewin-Mathes operates a copper refinery in the Midwest, is also an integrated maker of copper and brass tubing, pipes and rods at plants in Monsanto, Ill.

•

Witco Chemical Co. has formed a new Canadian subsidiary, Witco Chemical Co., Canada, Ltd. Witco has purchased a six-acre site in Trafalgar Township, southwest of Toronto, where it plans to construct a plant. Initial output will be chemicals for the paint, rubber, plastics and allied industries.

•

Foote Mineral Co.'s application for listing its common stock on the New York Stock Exchange has been approved by the exchange's board of governors. Trading is expected to begin in the middle of July.

•

Linde Air Products Co. Ltd., a division of Union Carbide Canada Ltd., has acquired Independent Oxygen Ltd. (Lethbridge, Alta.). Details of the transaction have not been revealed, but a Lnide spokesman said the company plans to expand the Lethbridge firm to meet rising demands for industrial gases in southern Alberta.

•

Dayton Rubber Co. and Cadillac Plastic and Chemical Co. (Detroit) have completed a merger through an exchange of stock.

Cadillac will operate under its old name as a wholly independent subsidiary of Dayton. Cadillac is a major distributor of plastics; Dayton is a maker of rubber products, and a pioneer in the development of urethane.

•

W. P. Fuller & Co. (San Francisco), a privately held company, has offered 20,200 shares of its stock for public sale.

The shares, formerly held by Margaret Fuller Brown, granddaughter of the founder, are being sold at $37/share through two underwriters, Blyth & Co. and Shuman, Agnew & Co. The shares represent less than half of what she now owns.

Fuller is a large West Coast manufacturer of paint and plate-glass products with sales of $77.6 million last year.

FOREIGN

Fertilizer/Italy: Montecatini has begun construction of a fertilizer and chemical plant at Campfranco, Sicily, It will draw on extensive potassium sulfate deposits there, which will produce 2,000 tons of ore daily. The plant will have an annual output of approximately 50,000 tons of potassium oxide, enough to fulfill Italy's entire needs and make possible substantial exports. A big part of the output will be shipped to another Montecatini plant at Port Empedocle for the production of other fertilizers.

•

ICI/United Kingdom: Imperial Chemical Industries Ltd., plans to spend about $140 million on expansion this year, says Sir Alexander Fleck, ICI board chairman. During 1956, about $123 million went for fixed capital expenditures, bringing the total since the war to about $747 million. Capacity will be raised for Terylene, ammonia, ammonia derivatives, including fertilizers, light and heavy soda ash, chlorine and chlorine products, and diisocyanates.

•

Graphite/Brazil: The Compagnie de Produits Chimiques et Electrometalluriques (Paris) will join I. R. F. Matarazzo (*CW, March 2, p. 24*) to build a plant to produce graphite carbon products and industrial electrodes for electrical furnaces at São Paulo. The factory, the first of its kind in Brazil, is slated to produce 4,000 tons of graphite electrodes and 6,000 tons of paste for electrodes (Soderberg type) annually.

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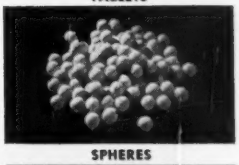
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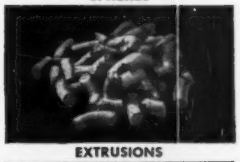
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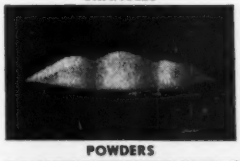
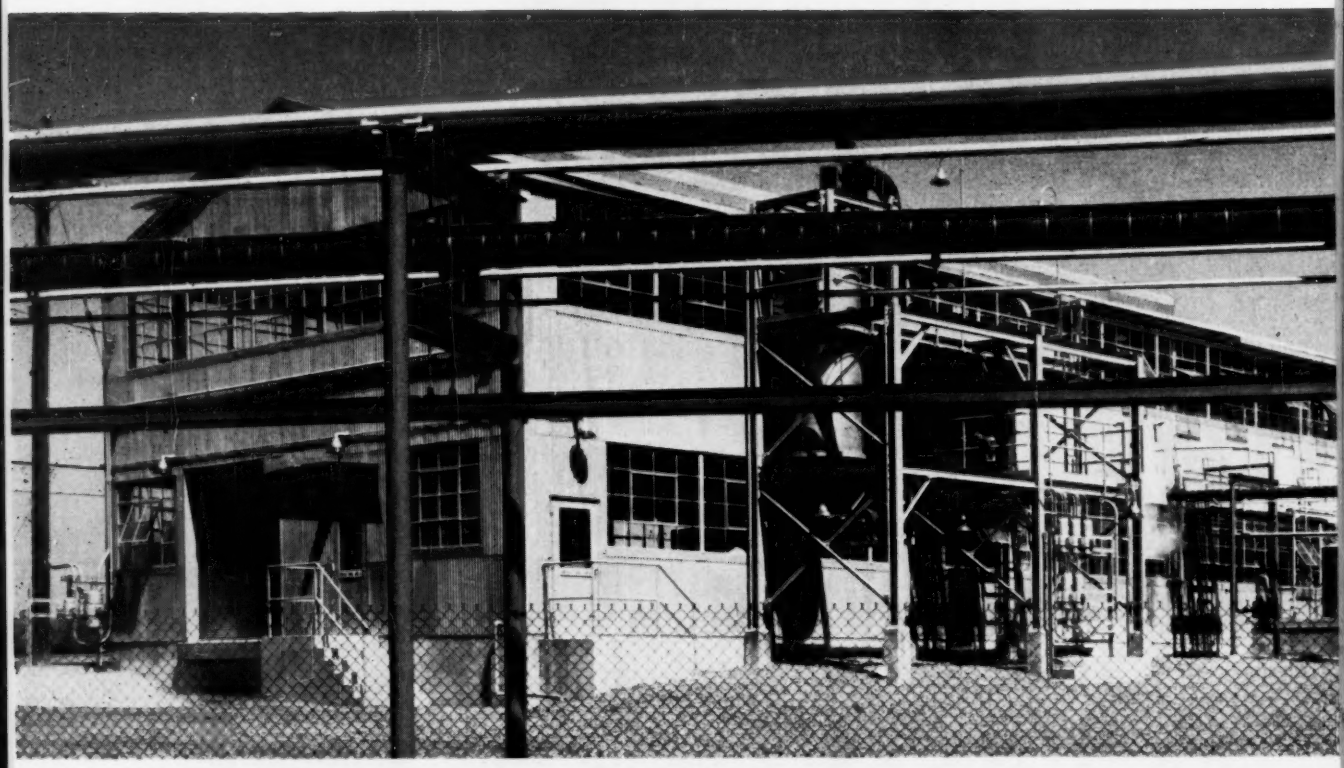

POWDERS

FLAKES

ENGINEERING

CW, with this issue, inaugurates a new department, Engineering, which incorporates some of the features of our familiar



Hercules' semiworks plant at Parlin makes the startup easy on first commercial Ziegler polyethylen

Ziegler Polymerization Gets Its Full-Scale

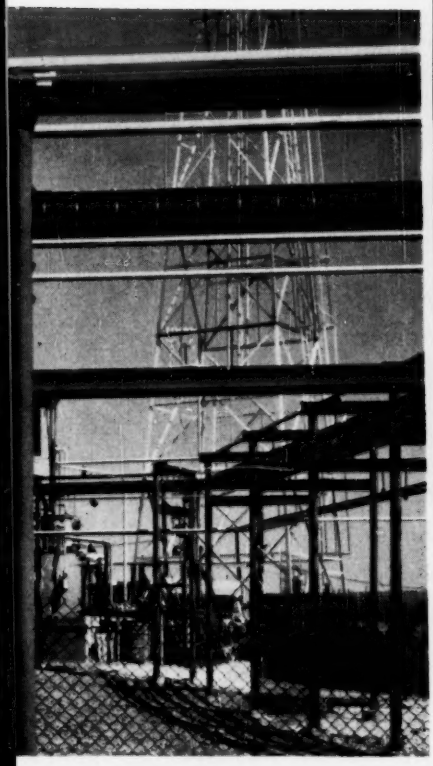
Ziegler (left) and Hercules executives look over new plant.

". . . And a very good business to Hi-fax." With these words, Karl Ziegler last week gave his blessings to the startup of Hercules' polyethylene plant at Parlin, N. J.—the first one in this country to start commercial production under his license.

On Monday, Ziegler had toured the plant to see what U.S. engineering had wrought on his now-famous process. On Tuesday, Hercules had a press luncheon to commemorate the occasion in New York City midst the plush, rustic confines of 21's Hunt Room.

Unfortunately, however, the plant was not able to start up on schedule. Minor difficulties prevented Esso Standard Oil from delivering the ethylene from its nearby Linden plant on schedule. But, if all goes as now planned, ethylene will start flowing through the pipeline this week, and

Production department. For an explanation of the reasons for setting up this new section, please turn to page 6.



plant in this country.

U.S. Test

the Hercules operation will get under way.

With a Little Bit of Luck: After commenting informally in reference to the official startup ("It must be going; I turned on the valve myself yesterday"), Ziegler took advantage of the occasion to fill in some of the background that led to the development.

Undoubtedly—and understandably—Ziegler must feel some resentment about the accounts that have played up the accidental part of his discovery. He made it clear that he had spent his whole life studying organometallic compounds, and although he didn't start out to develop a new process for making polyethylene, it became quite clear at a certain point in the development that aluminum triethyl could be used to make it.

It was during their series of ex-

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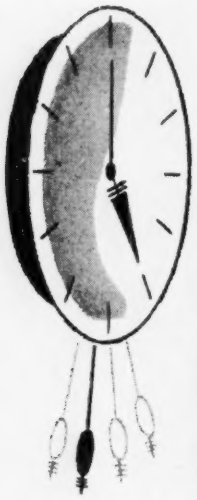

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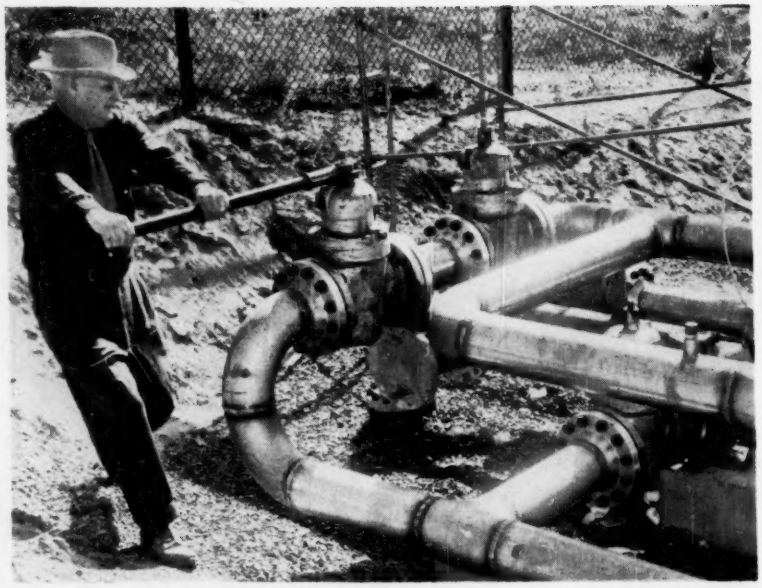
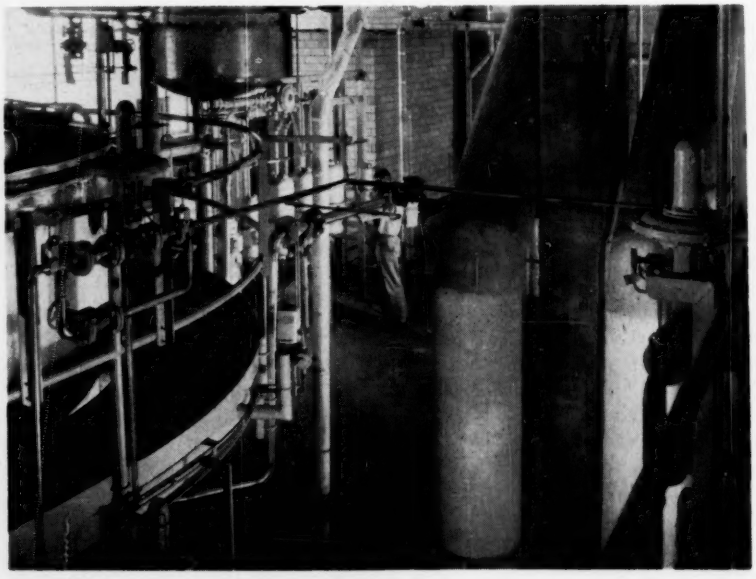


Ethylene pipeline: minor difficulties hold up ethylene delivery.

periments originally planned for quite another result that Ziegler and his coworkers found how to activate the catalysts. Thus, though there was a certain amount of serendipity involved, the invention was the end result of a long, systematic research effort in the field of organometallics.

At the Ready: Despite the disappointment about the startup, Hercules has no qualms at all about the Parlin operation. The plant, rated at 30 million lbs./year and costing more than $10 million, is an exact replica of a semiworks plant the firm has been operating for some time. Thanks to the experience it has amassed on its own and through its agreement with Farbwerke Hoechst to swap know-how, Hercules feels that the "shakedown is behind us" even before the plant has started up.

Exactly what it has learned about the process and how it has scaled up



Processing section at Parlin uses Ziegler catalysts to make polymer.

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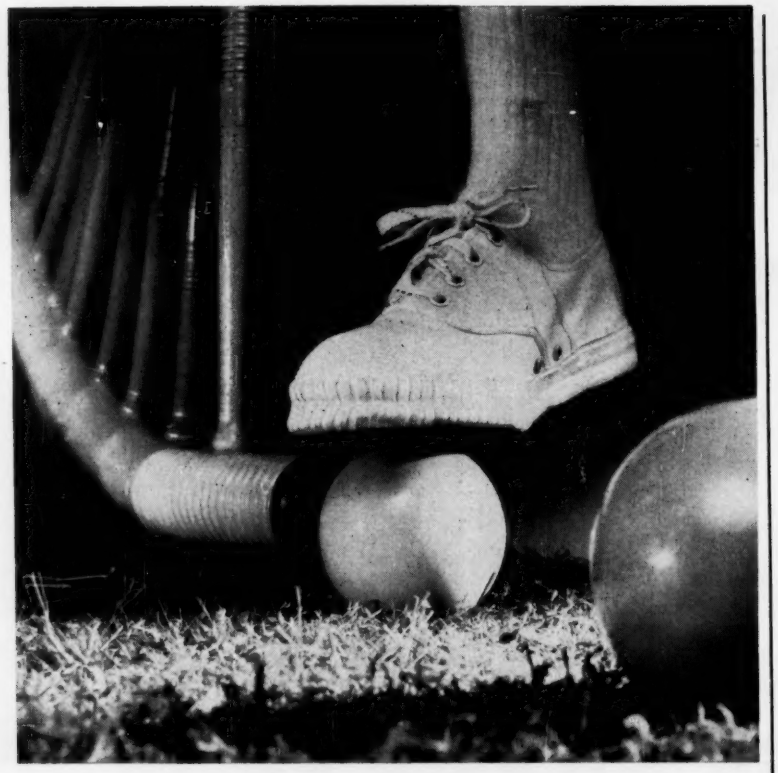

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Ziegler's lab experiments are some things that Hercules is keeping very quiet about. It describes its process like this: Ethylene, the catalyst system and the diluent are introduced into the polymerizer. The resulting slurry is first treated to decompose the catalyst, then filtered and purified. The mother liquor is returned to the diluent system and the solids are dried and pelletized to produce the Hi-fax polyethylene molding powder. The catalyst system consists of a metal alkyl (e.g., aluminum triethyl) and a Group IV-VIII metal compound (e. g., titanium tetrachloride).

However, Hercules' Paul Johnstone points out that there are thousands of possible combinations that may be described as Ziegler catalysts. Also, there are any number of possible ethylene polymers that can be produced. Choosing the catalyst and choosing the polymer he characterized as among the toughest problems facing anyone working in the field.

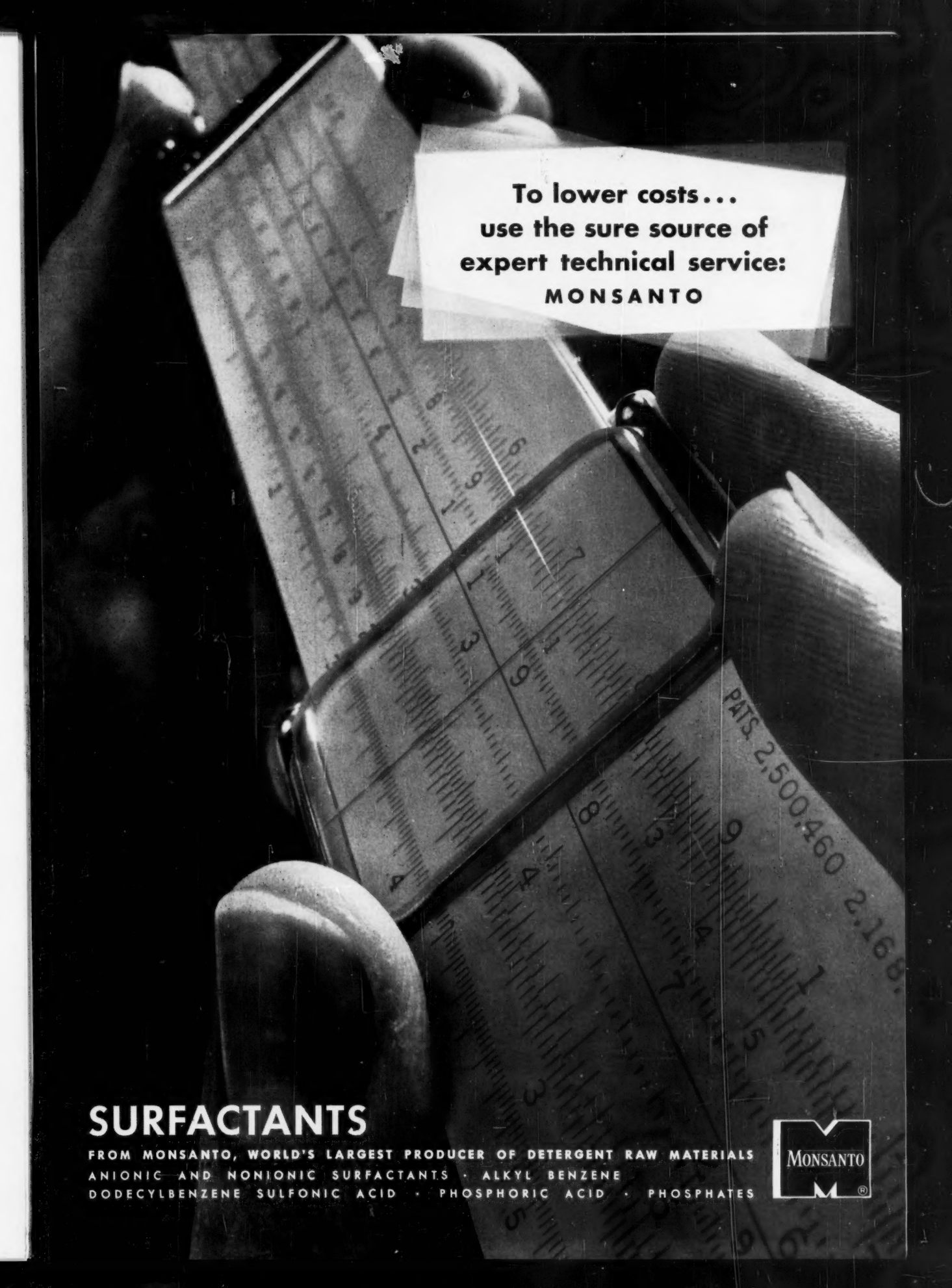
Johnstone also made it plain that Hercules was working on copolymers, alloys and other polyolefins, and would start to make them if product evaluations proved favorable. He said the firm is doing active lab work on polypropylene, thought that a decision on the feasibility of making it commercially would be made within a year.

The New Look: One of the big questions facing Ziegler polyethylene is how it will fare in the marketplace against similar materials produced by the Phillips process or by the Standard Oil of Indiana process. Says Konrad Weil, Hoechst vice-president, who came over for the opening: "We Germans feel that we have taught you a few things. We know we've learned something, too. One of the things we've learned is not to be afraid of competition."

Looking for a Lift

As a result of expanding uses in the missile and rocket industry and potential applications in the nuclear power field, helium production is soaring rapidly upwards along an ever-steepening growth curve. But new and improved equipment for handling and controlling helium gas and liquid is needed if helium is to realize its full potential.

That's the gist of talks delivered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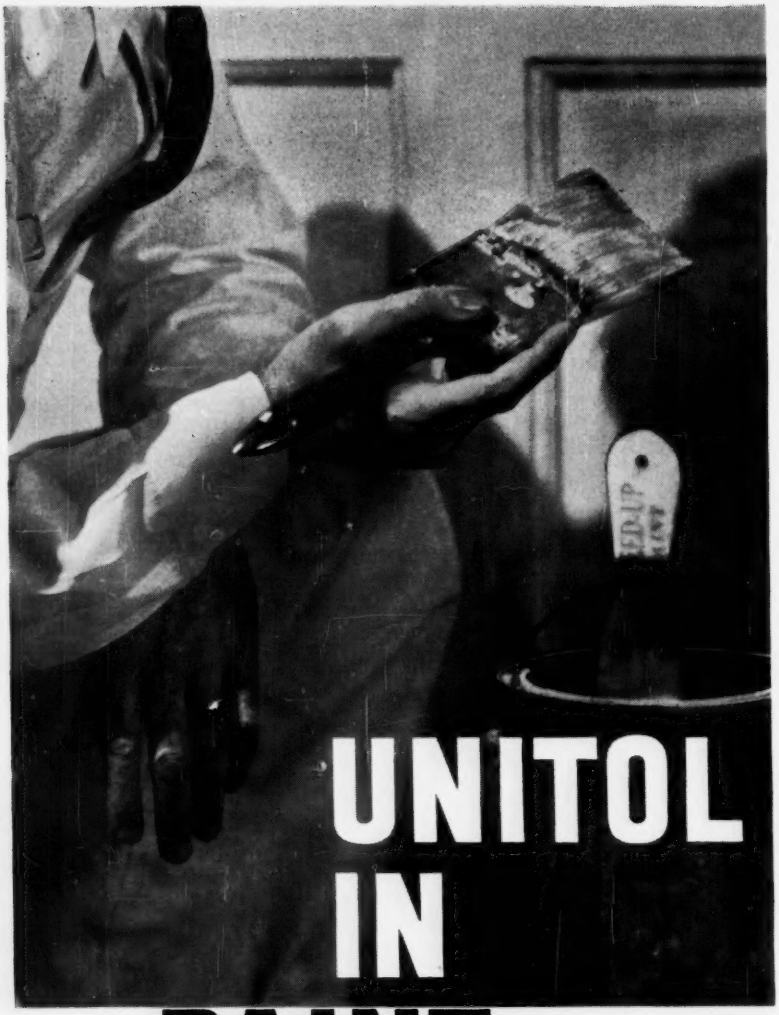

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ENGINEERING

by 18 speakers to some 250 engineers and scientists assembled last fortnight at the Disneyland Hotel (Anaheim, Calif.). Occasion: the first U. S. symposium on helium, sponsored by the Aeronautical Division of Robertshaw-Fulton Controls Co. (Anaheim).

Production Limited: Highlighting helium's rapid growth, Paul Mullins of the U. S. Bureau of Mines noted that missile and rocket applications have swelled demand 500% since 1950*, will require upwards of 300 million cu. ft. of the strategic gas by 1960. This enormous growth has produced a critical shortage of helium during the last 12 months. But Mullins emphasized that the shortage was caused by limited helium production facilities rather than by a shortage of the gas itself.

His optimistic prediction: helium output will increase some 20-30% by late 1957, add another 20-30% by mid-'58. At present, said Mullins, 70% of helium production is purchased by military agencies of the federal government, 30% goes to commercial distributors who channel about half their share into military projects.

Equipment Key: The vital role of equipment was stressed by William Lawrence of Edwards Air Force Base. Military agencies are in urgent need of improved handling and control equipment—particularly pumps, valves, filters and fittings, said Lawrence. Continued growth of the rocket industry, he added, depends to a large extent on the adequacy of gas component designs.

One solution that would offer a number of advantages in handling, transportation and storage of helium, suggested Lawrence, would be the development of suitable high-pressure handling and control equipment to permit the use of helium in liquid form.

PROCESSES

Wine from Sugar: A new process that utilizes sugar to bypass the need of grapes is now being offered in the U.S. by Dutch inventor Jacob Bruinier. Based on a patented technique (U.S. patent 2,608,484), the method involves the separate preparation of a vegetable extract to supply the bou-

*Federal shipments took 42.3 million cu. ft. of helium in 1950, nonfederal sales accounted for 21.1 million. (*CW, Nov. 28, '53, p. 77*).

NOTE THESE 11 MAJOR PRODUCT GROUPS FOR WHICH STAUFFER IS A LEADING SOURCE OF SUPPLY

Stauffer is the country's largest or second largest producer of several industrial chemicals, a leading producer of many, the only producer of some.

The experience of many years as a major source of supply equips us to be a major source of assistance to manufacturers needing information on the application of these basic chemicals.

BONE PRODUCTS
Animal Charcoal
Animal Glue
Bone Meal
Tallows

CHLOR-ALKALI PRODUCTS
Chlorine
Caustic Soda
Soda Ash
Lime

CHLORINATED SOLVENTS
Carbon Tetrachloride
Chloroform
Methylene Chloride
Perchlorethylene
Special Solvents

COAGULANTS
Aluminum Sulfate
Ferric Sulfate

FLUORINE COMPOUNDS
Hydrogen Fluoride

INDUSTRIAL SULFURS
Refined
Flowers
Roll
Crystex®

METALLIC CHLORIDES
Aluminum
Antimony
Boron
Silicon
Titanium
Zirconium

MINERAL ACIDS
Muriatic Acid
Sulfuric Acid
Oleum
Hydrogen Chloride

NITRE PRODUCTS
Potassium Nitrate

SULFUR COMPOUNDS
Carbon Bisulfide
Sulfur Chlorides
Sodium Hydrosulfide
Perchloromethylmercaptan

TARTAR PRODUCTS
Tartaric Acid
Rochelle Salt
Cream of Tartar

Stauffer has 50 manufacturing plants widely distributed throughout the United States and Mexico. These offer broad flexibility in supplying both normal and extraordinary requirements. No Stauffer customer, for example, has ever run out of Carbon Bisulfide. Advise us if Stauffer and its immense facilities for Research and Production can be of help to you.

Informative Stauffer publications on Sulfur, Boron Products, Chlorinated Hydrocarbons, Hydrofluoric Acid and Metallic Chlorides are available on request.

STAUFFER CHEMICAL COMPANY

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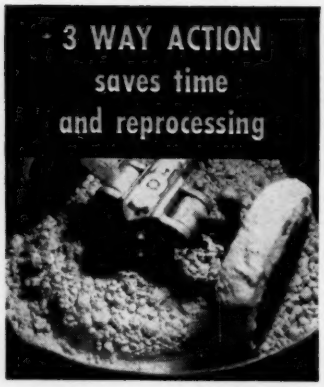
Stauffer CHEMICALS SINCE 1885

Controlled dispersion for better blends:

If you're coating a fine, dry material; blending liquids into a dry powder . . . or dispersing a small amount of one material into another you need more than a simple stirring, tumbling or agitating action to achieve the desired results.

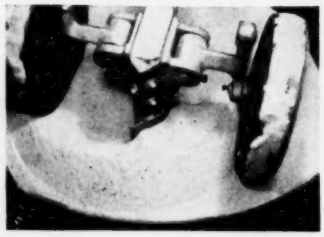
In the Simpson Mix-Muller a *three-way* kneading, smearing, spatulate action actually coats one material with another—rather than placing them *next* to each other. Agglomerates are broken up, moisture or binder dispersion is thorough. You get an intensive, homogenous mix that *stays* mixed and will not segregate in storage or transit. Want proof? Write for details on a confidential test. See what *mulling* can do and remember . . .

MIXING IS OUR BUSINESS

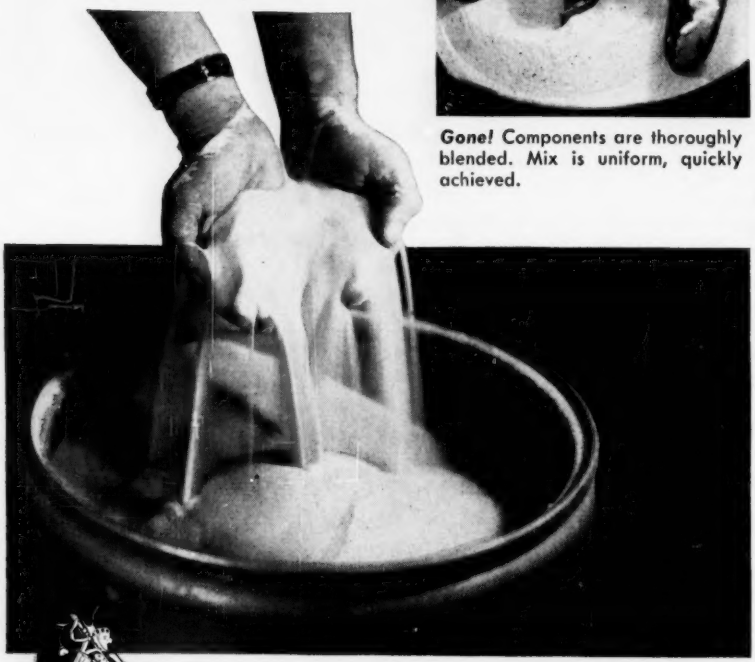


after liquid addition mix is lumpy.

Going! Agglomerates start to respond to kneading, spatulate action.



Gone! Components are thoroughly blended. Mix is uniform, quickly achieved.



SIMPSON *MIX-MULLER*® DIVISION

National Engineering Company
636 Machinery Hall, Chicago 6, Illinois

quet, controlled fermentation of sugar to provide the alcoholic content of the wine. The flavoring extract can be made from a variety of low-cost vegetables, but the wine makers' know-how plays an important part in using the proper ones to produce the desired taste. One gallon of wine requires 2-2½ lbs. of sugar, fermented by conventional methods. Added advantages claimed for the process: no methyl alcohol or fusel oil is produced as an undesirable by-product; wine requires no aging.

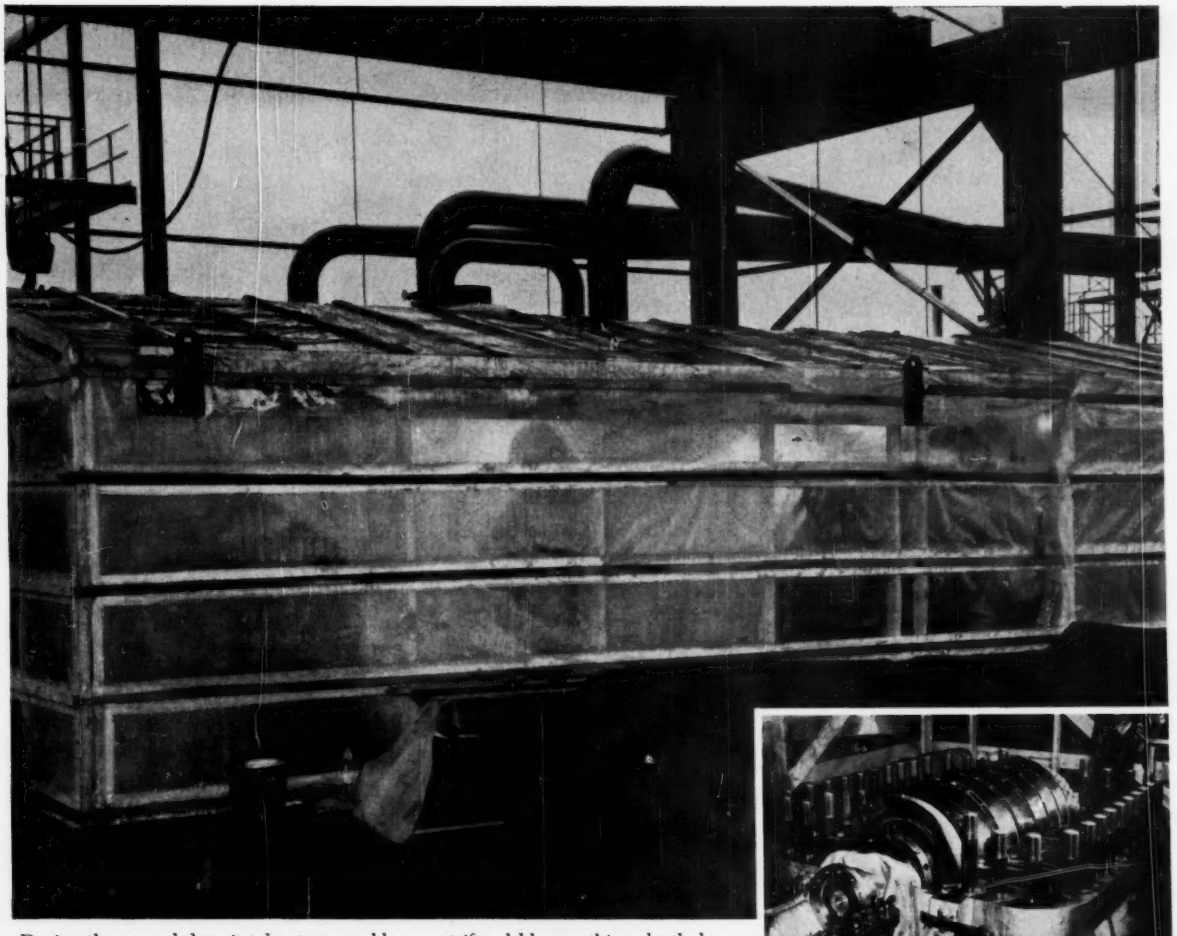
•

Manganese Sulfate: India's Central Electro-Chemical Research Institute (Karaikudi) has developed a method of extracting manganese from ore as 93.6%-pure sulfate monohydrate. Worked out for 20- to 30-lb. batches of $MnSO_4.H_2O$, the process is said to recover about 60% of available manganese. The ore is first mixed with a reducing agent (charcoal or coke) and roasted at a moderately high temperature. The calcined mixture is then stripped of manganese by leaching with dilute sulfuric acid. After removal of impurities, the leach liquor is concentrated to saturation; manganese sulfate crystallizes out of solution.

•

Sulfide Roasting: To overcome inherent difficulties that make small-scale recovery of copper from sulfide ores uneconomical, Australian scientists have devised a new method and equipment based on fluidized processing techniques. The process is basically similar to large-scale sulfide roasting operations, depends on oxidation to convert copper into compounds soluble in dilute acid, sulfur into sulfur dioxide.

Key to the fluidized operation is the Australian-designed reactor that introduces air through a series of deep, tapered holes merging into a honeycomb pattern at their upper ends. Occupying most of the roaster cross-section, the air-distributing base overcomes the tendency of particles to agglomerate and form large solid deposits in the lower part of the roaster. A 6-tons/day reactor at the Commonwealth Scientific and Industrial Research Organization (Melbourne) has produced compounds from which, it's claimed, copper can be obtained readily by the electrolytic process.



During the several days it takes to assemble a centrifugal blower, this polyethylene covered shelter protects interior parts from moisture. Otherwise, corrosive sea air would be a major hazard. Film remains durable and flexible even at sub-freezing temperatures.

How low-cost polyethylene film provides

new protection for and against chemicals

Costly pump machinery received "indoors" protection while being assembled outdoors at the new Tidewater Oil Company refinery near Wilmington, Delaware.

Tough film made of BAKELITE Brand Polyethylene, tacked to wooden frames, forms this effective shelter . . . protects against weather and corrosive air. This same low cost, polyethylene film is already a material of major importance in packaging chemicals—where the same protective properties are so applicable.

Polyethylene film properties include inertness to most chemicals and the ability to markedly reduce the passage of moisture vapor. Current uses range from drum liners to heat-sealed pouches. Your own product might profitably be added to the list. For information, write Dept. YQ-34.

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WYANDOTTE CHEMICALS CORPORATION, WYANDOTTE, M

ARE YOU FISHING FOR NEW CHEMICAL PROPERTIES THAT WILL GIVE YOUR COMPETITORS FITS?

In this competitive era, it's not enough to have a good product. You have to be constantly searching for better ways to make it . . . or a completely new product altogether. This is the only manner in which you can stay ahead of competition.

That's where the PLURONIC® series shines. This unique group of 100%-active block-polymers opens a brand-new avenue of exploration for you.

The PLURONICS are unique forms of difunctional polyethers, with variable hydrophobic and hydrophilic properties.

With a given hydrophobic unit, an increase in weight of the hydrophilic groups improves water solubility, dispersing property, sequestering ability, etc.

For a fixed weight of the hydrophilic groups, variation in the size of the hydrophobic unit affects detergency, emulsifying, foaming, absorption, etc.

Evaluating the various PLURONIC grades is not a haphazard operation either. By using the PLURONIC Grid, on which the available grades are plotted by molecular weight and hydrophobic-hydrophilic ratios, you can concentrate on those PLURONICS which offer the most promise for you.

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So, if you don't have a PLURONIC Grid, write for your copy now.

If you do have the Grid, remember that recent additions to the PLURONIC series, and important new application developments, make it advantageous to you to keep in touch with us.

**Pencil-o-metric evaluation* is the ability to predetermine the performance of a chemical raw material in a formulation or process prior to actual laboratory study.

MICHIGAN ALKALI DIVISION

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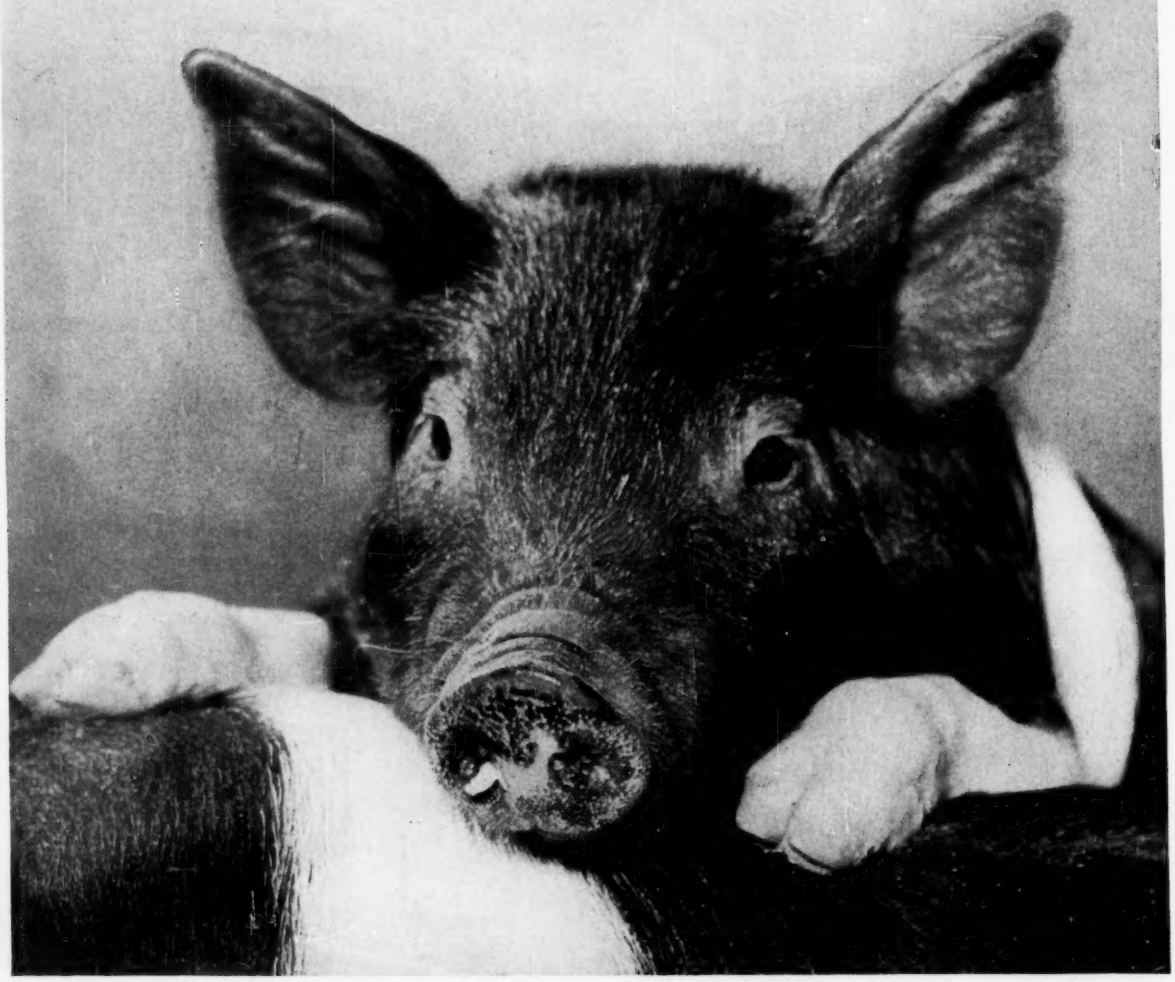
"I'm going to market and you can bet I'll bring a top price and make good eating—thanks to Dalpac BHT."*

Now that fats are being used in swine rations and other livestock feeds, feed manufacturers are turning to Dalpac antioxidant to protect the vitamin content without over-fortification. Dalpac also prevents rancidity of feed despite long periods of storage and transportation. Dalpac helps to guard the accuracy of the manufacturer's label. Dalpac is finely ground to permit easy processing and good dispersion. A little Dalpac goes a long way —just 4 ounces to the ton does the job.



Dalpac is available nationwide from:

Chemical Department McKESSON & ROBBINS, INC. *155 E. 44th Street, New York, N. Y.*

DALPAC* FEED GRADE BHT

*HERCULES TRADEMARK

A Product of Oxychemicals Division, Naval Stores Department

HERCULES POWDER COMPANY
INCORPORATED

992 Market St., Wilmington 99, Del.

Washington Newsletter

CHEMICAL WEEK
June 29, 1957

Defense essentiality procedure—the technique through which domestic producers can get tariff protection if adjudged essential to defense efforts—has hit another snag. Independent U. S. oil companies, the first industry group to get the Office of Defense Mobilization to certify their need for protection to the White House, are now sweating out how and what President Eisenhower will do.

The White House has given up hopes of turning the question over to a study group or commission such as the one headed by Clarence Randall that advises on over-all U.S. trade policy. The matter now apparently will rest with—and be decided by—the Cabinet's own fuel policy committee.

•

A step easing U.S. restrictions on trade with Communists is being taken by the Commerce Dept. A ruling put out last week allows exporters more leeway in shipping nonstrategic goods, including a long list of chemicals, to iron curtain ports. They no longer need to apply for special licenses for the listed items, and may ship them under general license provisions. A shipper of photographic chemicals, for example, need no longer ask for special permission for each shipment, but simply may obtain a general license to ship his product.

A note of qualification, however: this does not mean that the U.S. has lifted its embargo on U.S. trade with Red China, nor does it mean that U.S. exporters may ship anything to the Soviet bloc that they were banned from shipping up to now.

But the move does indicate a disposition on the part of Washington officials to relax trade restrictions wherever they can, consistent with over-all U. S. trade policy. This much Secretary of State Dulles promised trade-hungry U.S. allies over a year ago. The new regulations are a partial fulfillment of that promise.

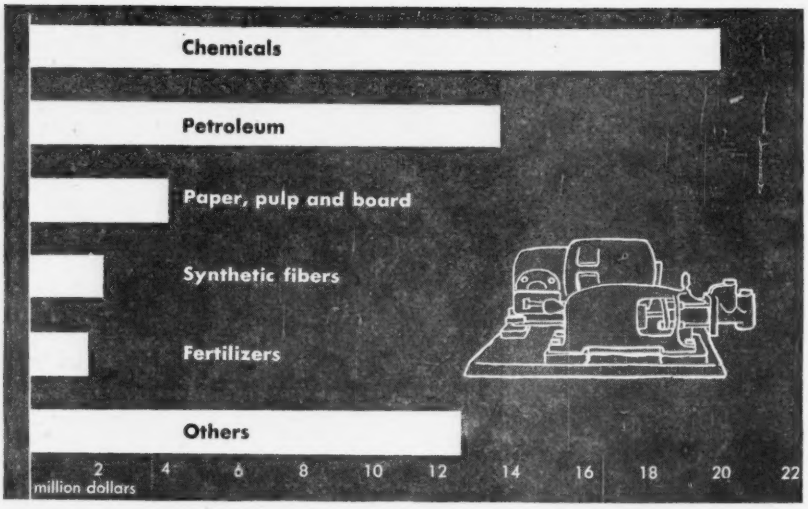
•

What to do with the WOCs? The Commerce Dept.'s Business & Defense Services Administration is wrestling with this problem, now that the decision to replace industry men with career civil servants as operating heads of its various divisions (*CW Washington Newsletter, June 15*) has been firmed up by Commerce Secretary Weeks. Commerce people say they will still use WOC's services, placing them as consultants, assistants to the division directors. But the shops will be run by government men who previously served as deputy directors.

The Chemical and Rubber Division chief, Monsanto's Hal G. Johnson, is scheduled to leave June 28. Lowell Kilgore has been serving under him as the career deputy director.

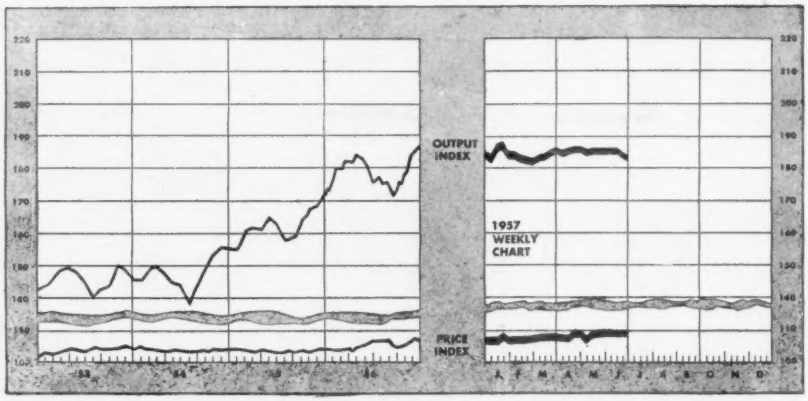
Charting Business

CHEMICAL WEEK
June 29, 1957



Pumps: $54 Million Sales to CPI

A COMPREHENSIVE McGraw-Hill survey of equipment and materials shows that last year chemical process industry firms spent $53,788,000 in direct purchases of pumps. Among them, the biggest buyers were the chemical and petroleum segments —$20 million and $13.6 million worth, respectively. Largest chunk of total purchases went for centrifugal pumps, about $30 million, while rotory pumps trailed in second place, about $9 million.



Business Indicators

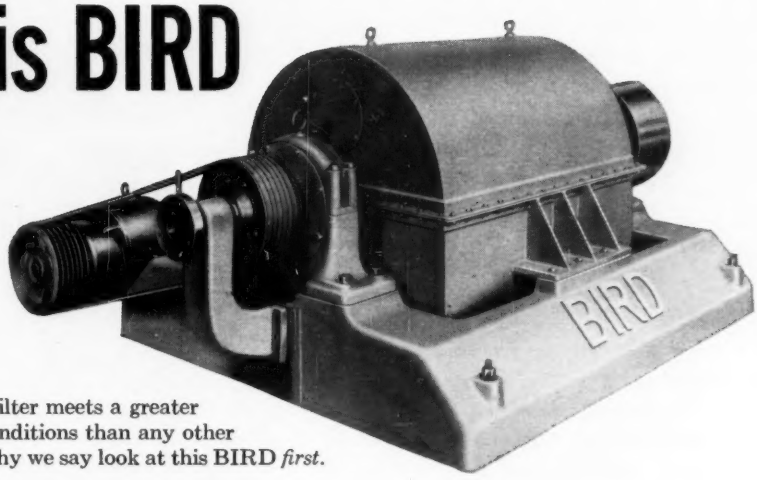
WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	182.5	184.0	176.6
Chemical Week wholesale price index (1947=100)	110.1	110.0	105.5
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	45.82	45.82	47.93

MONTHLY Trade (million dollars)	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All manufacturing	28,549	28,770	27,231	52,482	52,263	47,958
Chemicals and allied products	2,038	2,057	1,970	3,863	3,821	3,407
Petroleum and coal products	2,778	2,716	2,499	3,123	3,131	2,817

when you have to separate a SOLID from a LIQUID

Look at this BIRD *first!*

It may save you a whole lot of time, trouble and money



The Bird Continuous Centrifugal Filter meets a greater range of solids-liquids separating conditions than any other type of filter or centrifuge. That's why we say look at this BIRD *first*.

Solids Can Be Coarse or Fine or a Mixture — as coarse as half inch, as fine as a fraction of a micron, or any combination in any proportion.

Feeds Can Be Thick or Thin — slurries are being handled from two to seventy per cent solids and can vary all over the lot without throwing this BIRD off stride.

Feeds Can Be Hot or Cold — in actual application the range is from minus 100° F to plus 300° F. Hot saturated liquids are "duck soup" for this BIRD. Temperature change in the BIRD is relatively slight.

Materials Can Be Volatile or Hazardous — the BIRD can be made vapor or fume tight and can be constructed for operation under pressure when required.

Solids Can Be Washed — an efficient counter-current wash action is effected. When leaching time is a factor in wash thoroughness, BIRDS may be installed in series with repulp between.

Volume Can Be Large or Small And Can Vary — the BIRD comes in several sizes. Solids throughout may range from 200 to 120,000 lbs. per hour; filtrate from 1 to 700 gpm.

THINK about the conditions *your* solids-liquids separations must meet. Can any other filtration equipment meet them all? Meet them as well as the BIRD?

The Bird Research and Development Center is fully equipped to provide authentic and confidential test findings on a pilot scale. Use it to make certain of best results before you invest in any solids-liquids separating equipment.

BIRD MACHINE COMPANY

Builders of

- Bird Continuous Centrifugal Filters
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For specific information on individual machines write:

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THE CHEMICAL

ENGINEER IS A MEDICINE MAN

*...he, too, "changes his face" according to his function...production or processing, management, maintenance, design and construction, research and development...the all powerful, multiple buying influence of CPI**

Catch up with the busy chemical engineer in the *Chemical Process Industries, and you'll find him wearing many masks, functioning under several different labels. Perhaps he's a *Field Engineer* trying to iron the "bugs" out of a new giant process plant. Or he might be a *Process Engineer*, concerned with product quality and operating efficiency. Or a *Technical Director, Plant Manager, Maintenance Engineer...*

This is why, no matter where he fits in the CPI spectrum, pilot plant to front office, the chemical engineer is your single most important sales target. You can have him on your side if you'll just bear in mind these three basic facts:

1. ***All CPI buying begins with him. No new equipment, materials or supplies get into the plant except at his instigation.***
2. ***He recommends and specifies at every stage in the buying procedure.***
3. ***His primary source of product information, and of brand preference, has always been* CHEMICAL ENGINEERING*—the 3-to-1 choice among chemical engineers in all functions.***

No Johnny-come-lately, CHEMICAL ENGINEERING has been the basic building block of successful CPI sales for more than half-a-century—just as its editorial pages have been a post-graduate course for chemical engineers in all functions. And as the industry grows ever larger and more complex, as the influence of the chemical engineer grows daily more pervasive, the dominance of CHEMICAL ENGINEERING as the industry's primary marketplace grows ever more valuable to you.

THE CHEMICAL ENGINEER IN TECHNICAL SERVICE...
Bill Gravlee, an operations analysis man at Esso Standard Oil's Baton Rouge plant, writes "Editorially, CHEMICAL ENGINEERING forms a sort of post graduate course for me. I enjoy the ads and information received through Reader Service, too. They keep me up to date on what's available to help me solve on-the-job problems."

THE CHEMICAL ENGINEER IN PRODUCTION MANAGEMENT...
A key man in all buying decisions involving material or equipment is George Weber, Plant Manager of Stauffer Chemical's Brooklyn plant, who tells us, "CHEMICAL ENGINEERING keeps me fully informed on new products, new technology and engineering techniques. Nowhere else can I get such a wealth of the information I need."

THE CHEMICAL ENGINEERING CONSULTANT...
The influence of an independent engineering consultant like James J. Flynn of Philadelphia is felt in many plants during critical, decision-forming moments. He says, "To solve the wide range of problems a consultant meets, he needs the kind of up-to-the-minute technical information CHEMICAL ENGINEERING furnishes."

CHEMICAL ENGINEERING

...to sell the engineer, whatever his function

A McGRAW-HILL PUBLICATION (ABC-ABP) 330 W. 42nd STREET NEW YORK 36, N.Y.

Market research analysts have their eye on getting ahead. But for many, . . .

Dim Promotion Prospects Gnaw at Morale

SERIOUS morale problems may be fermenting in many a chemical company's market research department. Market research analysts, in a new cross-country survey,* tell *CW* that their top problem today is the limited opportunity for promotion. Some 24% of the respondents describe the problem as "big," another 34% consider it "moderate." Those figures contrast sharply with the viewpoint of the analyst's superior, the department manager. Only 5% of market research department managers rate the problem "big," only 22% term it "moderate" (*CW, April 27, p. 68*). The survey was conducted among the membership of the Chemical Market Research Assn.

What's behind this fertile source of discontent? Hard-and-fast answers to that poser can't be drawn from the survey. But the data shows how relationships between training, experience and income may bear on the situation. Market analysts, though they are almost as old, have almost as much industry experience and have the same educational background as department managers, earn substantially (27%) less on the average.

*Data in this survey is generally based on 43-47 replies.

The mean age of the surveyed market research analysts is 38.4 years. That's about a year less than the manager's average age, 39.5. Even less of a difference in education exists. While somewhat fewer analysts than department managers have master's degrees (48% vs. 53%), more analysts have taken their doctorate (15% vs. 11%). Curiously, almost twice as many analysts (20%) have obtained master's degrees in business administration as have the managers (11%).

When it comes to experience, the department manager has a limited but distinct edge. Compared with the manager's average 14.5 years in the chemical industry, the analyst has spent but 12.1 years. Of that, about 5 years have been in market research, 2 in research, 1.7 in sales, 1.5 in development, 1 in production, and the rest in a variety of duties. Only in development experience is there any noticeable differential between market research managers and analysts. With an average 2.8 years to their credit, managers have devoted almost twice as much of their career to development as has the market analyst.

Income: Despite the close similarity in age, educa-

tion and industry background, the analyst's average salary of $9,980 is markedly lower than the department manager's ($13,691). Generally, the longer the period of chemical industry experience, the fatter is the market analyst's pay check:

Years of experience	Salary
under 5	$ 9,000
6 - 10	9,530
11 - 15	9,790
16 - 20	10,500
over 20	11,153

Although income shows a modest upward progression with increasing age and experience, the position of market research analyst is most commonly valued at $10,000/year by management. About 44% of *CW*'s respondents report incomes of $10,000, not including expense allowances. And the income of 85% of the respondents fall into the $8,000 - $12,000/ year range.

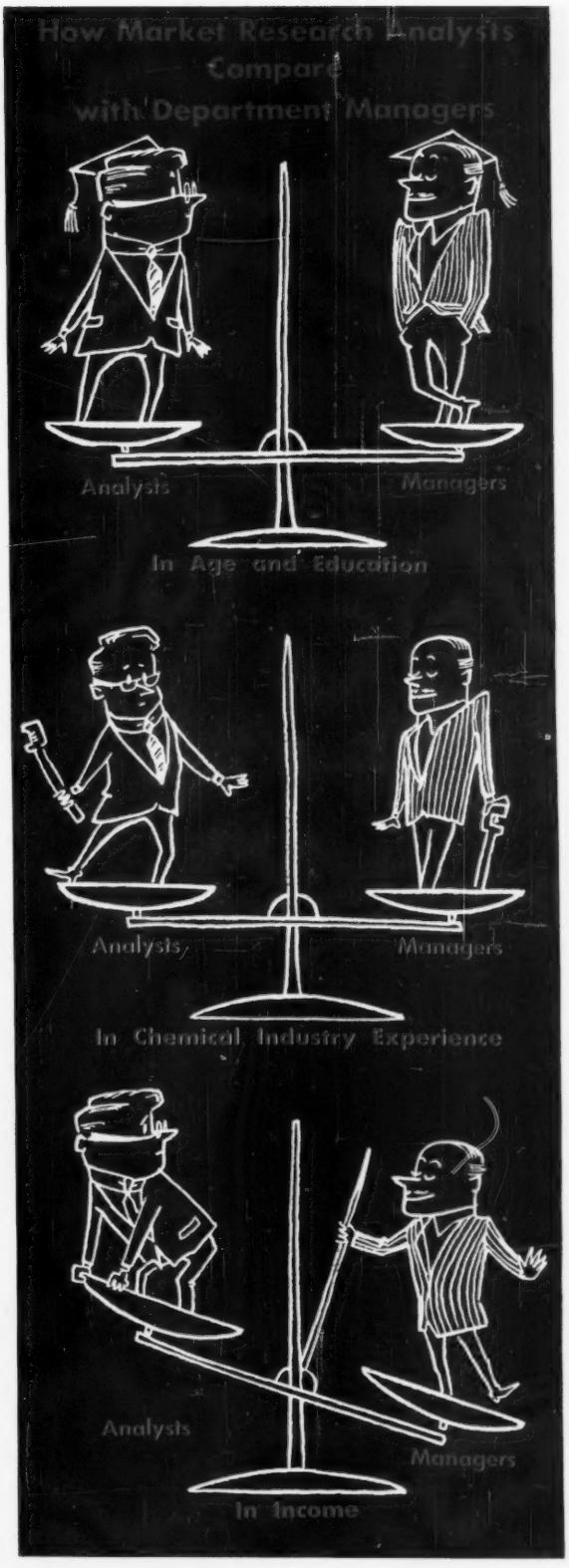
A master's or Ph.D. degree tends to increase an analyst's salary. Thus, the average holder of a bachelor's degree earns only about $9,150 annually after 11.9 years of chemical industry experience; the man with the master of science diploma draws some $11,100 with 13.8 years of service. Those with a Ph.D. report an average income of $9,830 with 11.6 years of industry background. But it's the analyst possessing a master of business administration degree that makes out best—$9,870/year for 8.9 years of experience.

Workload: While the analyst doesn't fare quite as well as the departmental manager, he also apparently has a less strenuous position. On the average, analysts make slightly fewer outside visits to gather data than managers (125 vs. 132 per year). And in a year's time, the analyst chalks up considerably less average travel mileage (15,800) than department heads (18,800). Some 23% of the canvassed analysts make more than 150 outside calls a year, while about 16% travel more than 30,000 miles annually.

Membership in professional societies, vital for business contacts, averages out to 2.9 societies per analyst, somewhat less than the 3.6 trade associations that market research managers belong to. All survey participants are CMRA members. Here's how membership compares:

	Managers	Analysts
	Percent of members	
American Chemical Society	76%	67%
Commercial Chemical Development Assn.	40	9
American Marketing Assn.	23	24
American Institute of Chemical Engineers	20	13
Chemical Industry Assn.	14	30

The market analyst has a lighter work load than his



ODD FACTS YOU SHOULD KNOW ABOUT CHELATION

7-Carbon Heptonates
Theory Cloudy—Economy Clear

Structural formulas for well-known chelates such as Ca-EDTA show one ion in the "claws" of one molecule; one molecule of Seqlene chelates 17 atoms of Fe $^{+++}$ in 3% NaOH. Structure unknown.
Seqlene (sequester + clean) is our name for hexahydroxyheptonates now brought from obscure research chemicals to staple articles of commerce. They are more effective, especially in alkaline solutions, and lower in price than are some better-known chelating agents.

PERFORMANCE EXCELLENT

One pound Seqlene crystals (sodium salt) solubilizes in caustic solution 0.6 lb. $CaCO_3$ and over 3 lbs. Fe^{+++}. One lb. Seqlene 350D (35% aqueous sodium salts) costs only 12-13¢ a lb. Most other ions are also chelated. Seqlene Free Acid, 50%, is useful for acid cleaning and preparation of water-soluble salts. Seqlene is non-toxic.

MANY USES

Present and indicated uses are alkali cleaning (including in the presence of phosphates), derusting, and paint-stripping; mercerizing, dye leveling, rayon spinning, kier boiling, washing woolens and cheese-cloths, tanning, in detergent formulations to prevent iron stains, cleaning of food equipment, inhibiting corrosion in water systems, in water-base paints, photographic baths, refining of fatty oils, electro-plating and others.

Technical bulletin, prices and samples are yours for the asking.

PFANSTIEHL
LABORATORIES, INC.
104 Lakeview Avenue Waukegan, Illinois

boss. During a year's time, the average analyst works on 29 projects requiring less than one day to finish, 16 projects taking one to five days, seven that need one week to one month of working time and six demanding more than one month to complete.

On the whole, however, managers tend to have a great many more short-term and long-term projects. The higher figure for managers probably stems from his supervisory position.

Although the work schedule varies, analysts and managers handle essentially the same types of projects. Market analysis of products not currently made by his firm takes about 45% of the analyst's working time. Another 28% of his time goes for studies of sales and distribution patterns of the company's current product line. And, the chemical market analyst spends about 15% of his time determining the market position of competitive products. The time allotted to studies of purchasing motivation (2.3%) and to determine the best distribution channels and methods (4.0%) is considerably less than that devoted by managers to the same areas (6 and 10%).

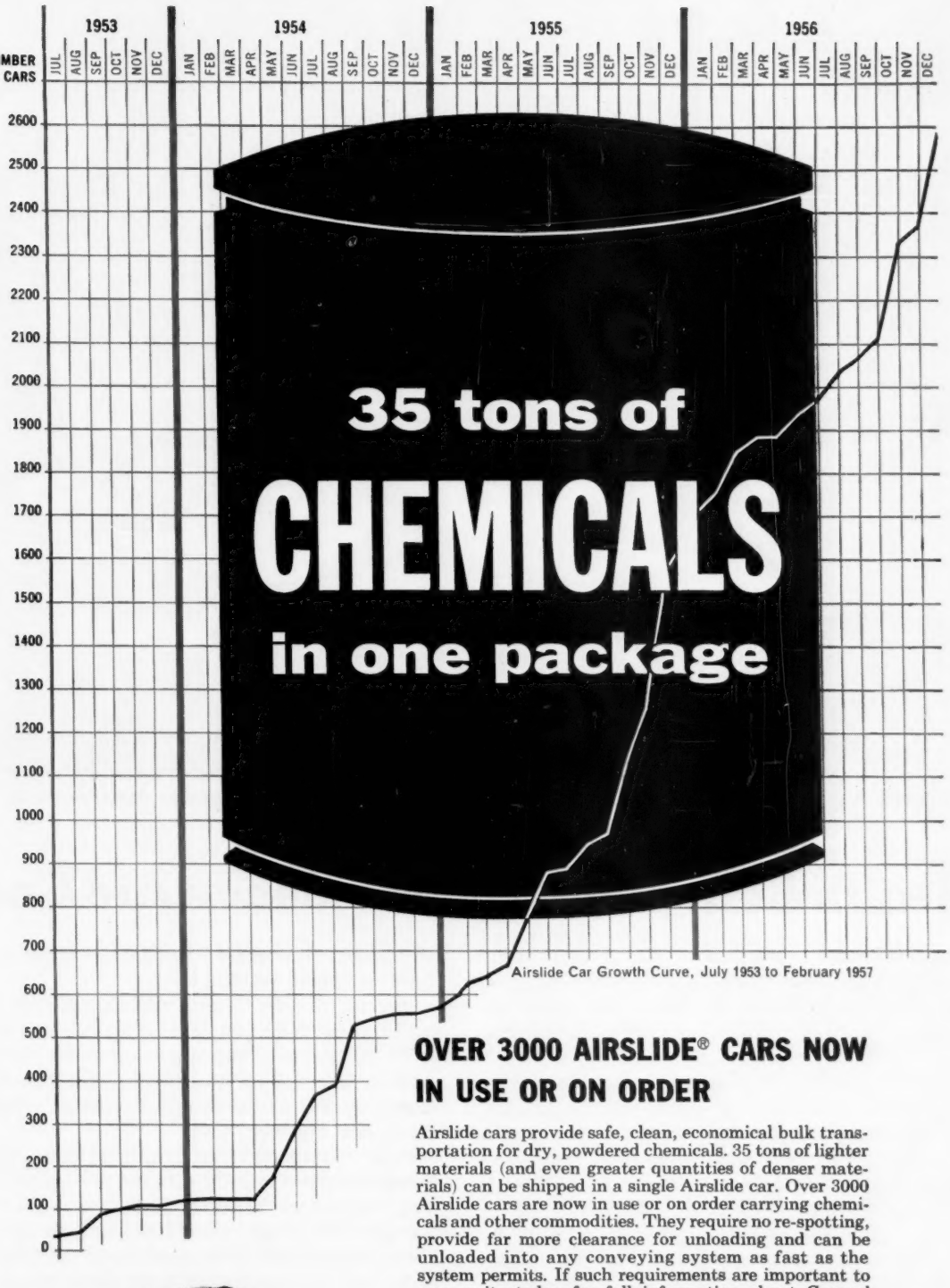
Problems: Better than twice as many analysts as managers are concerned about limited advancement prospects. Otherwise, the analyst is inclined to rate his problems much the same way as managers do. His serious problems: insufficient manpower, internal company communications and management recognition.

Although the analyst has a promotion problem now, his future isn't without hope. Market research, as a recent *CW* survey showed, is growing rapidly. That spells promotion opportunity for analysts.

Add Another Identity Symbol

Still another chemical process industry firm, Corn Products Refining Co., has joined the ranks of companies seeking broader industrial and consumer identity. Above, Corn Products' president, William T. Brady (*left*), accepts the firm's new corporate symbol from industrial designer, Harley Earl.

The new emblem sports a calligraphic "CP" in red within a circular yellow frame of corn kernel cross-sections. It will identify a line of 20 consumer and 450 industrial products. The company will use the "CP" insigne for the first time in forthcoming advertising, is presently scrutinizing product packaging and design with an eye to revision for efficiency and quick recognition.



Airslide Car Growth Curve, July 1953 to February 1957

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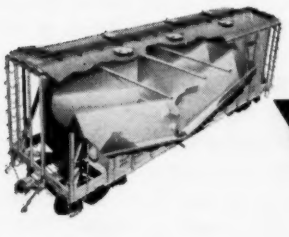

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PLOTTING AGAINST OBESITY: Chemical company continues its 3-year plan for investment in . . .

Health Education: The Dividends Are Good

Most everyone is absorbed—if not obsessed—with the state of his health and his waistline; and this may account for the success to date of a novel feature of Spencer Chemical Co.'s employee relations program: a yearly health education project.

Under way at some of Spencer's six plants this week: group employee meetings for lectures on "Proper Diet and the Dangers of Obesity," subject of this year's presentation. The theme was chosen when employees' annual physical examinations showed that more than 50% were definitely overweight.

This medical education plan got its start two years ago when Spencer cooperated with the American Cancer Society in an in-plant effort to alert employees to the importance of early detection and treatment of cancer. The "enthusiastic reception" of that program, according to Spencer's director of safety, John Smith, led to arrangements to cooperate with the American Heart Assn. in providing information on heart disease as a 1956 presentation.

Diet and Productivity Linked: This year's topic—proper diet—is a logical choice in continuing the plan, Smith said, because good nutrition is related to good health and high productivity.

Planning of these medical education projects is coordinated by Smith, but local plant administrators—safety or personnel managers—carry out their own presentations. Typical was this sequence of events in setting up the diet campaign at Spencer's Jayhawk Works near Pittsburg, Kan.:

First, a planning session (*above*) was attended by representatives from the state and county health services, the company's safety director, and the works manager. This group reviewed the available literature, posters and pamphlets for suitability to the local campaign; then drew up a schedule for distribution of such information—some of which was aimed at the employees' homes.

Meetings for All Shifts: Next, the committee scheduled a series of group meetings—or rather, it decided that the regular end-of-May safety meetings would be devoted to the diet campaign. These meetings—held in the plant auditorium at various hours to accommodate all shift workers, with attendance ranging from 30 to

100—were the culmination of a four-week period for distribution of information.

All these meetings were held on "company time." They included talks by speakers provided by the professional health services and the showing of a motion picture on the significance of proper diet. Smith said the group meetings appear to be the key to dramatizing the campaign message; they seem to enhance greatly the impact of the posters and take-home pamphlets.

Each year, a letter from the company's president, Kenneth Spencer, triggered the communication effort. In 1955 and '56, the company's contract physician and cooperating local physicians served as lecturers for the group meetings.

Personal Attention: In the cancer education campaign, employee response was so high that a "mole and wart day" was scheduled to follow the group meetings, and the company physician put in two days at the Jayhawk plant examining and removing moles and warts that employees were concerned about.

Management feels that the heart education campaign also produced good response, in that fears of cardiac conditions were reduced and heart disease prevention measures were encouraged. The '56 topic was chosen because 25% of Spencer employees were in the 45-55 age bracket—an age group with a high incidence of heart disease.

Spencer also has been carrying out the more conventional aspects of an industrial health and safety program, including annual chest X-ray examinations for some 300 employees.

The month-long medical education projects are slated to be continued, although next year's topic hasn't been announced yet. The company feels it can point to two concrete results of the program:

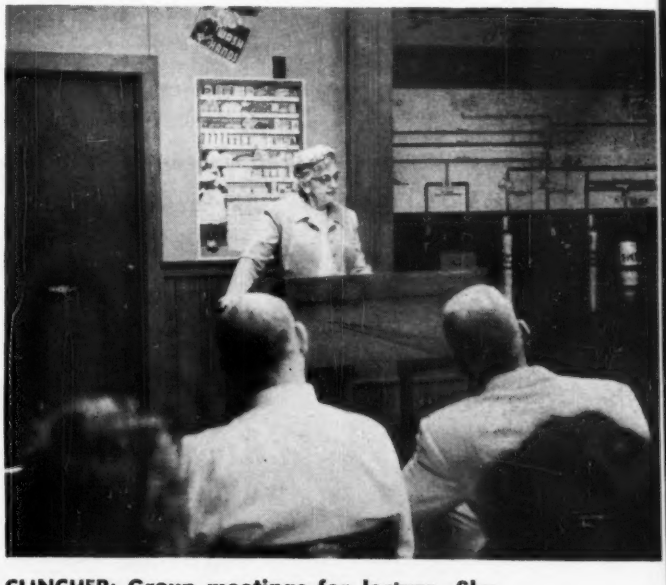
- A general improvement in employee health, with greater willingness on the part of employees to get medical advice and treatment when necessary.
- Enhanced "company spirit" on the part of employees, stemming from the feeling that by sponsoring the medical education campaigns, the company is demonstrating its interest in the individual employee and concern for his welfare.

While employees have shown keen interest in these opportunities to get authoritative information about major health problems, Spencer management is equally sold on the program as an investment in time that returns dividends in better employee health and in favorable human relations. The fact that management and employees have a mutual interest in the program was brought home to supervisors in the Jayhawk Works' planning session by Mrs. Theodora Stebbins, chief dietician at the Kansas State Hospital (Parsons) and president-elect of the Kansas Dietetic Assn.:

"It is the poorest sort of management," Mrs. Stebbins declared, "that permits overexpansion—whether in an industrial plant or in a waistline."

WARMUP PHASE: Posters introduce topic.

FOR HOME CONSUMPTION: Data on diet.



CLINCHER: Group meetings for lecture, film.

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ADMINISTRATION

Logjam Is Lessened

Chemical process management can take heart in the fact that delays in processing patent applications in the patent office have been somewhat reduced during the past year. But it still takes about 10 months before a new patent application is first examined, and an average of 3½ years before a new patent is issued. This situation is not likely to improve, according to the New York Patent Law Assn., unless the Patent Office is able to attract engineers and scientists to serve as patent examiners.

To the chemical process industry, which relies heavily on patents, delays in receiving patents create uncertainty as to the patent status of new products and processes, and tend to slow down or defer their adoption by industry and their introduction to the public. Not only do the delays handicap larger corporations; they also can be critical for the individual inventor and the small businessman whose operations revolve around patented products and processes.

The chemical process industry's role in this country's annual patent output was highlighted recently by the report of the Senate Subcommittee on Patents, Trademarks and Copyrights (*CW, Jan. 12, p. 32*). The subcommittee—of the Judiciary Committee—made a study of the distribution of patents issued to corporations between 1939 and '55.

The report shows that in a list of 394 corporations obtaining more than 100 patents during the period under investigation, 11 chemical process industry firms are among the first 50 companies.

LEGAL

Caustic Dust Suit: Fifteen employees of Food Machinery and Chemical Corp.'s Westvaco plant in South Charleston, W.Va., have asked the state supreme court to hear their appeal from an April '53, Kanawha County ruling favoring the company.

The employees had parked their cars in a company lot within 300 ft. of the firm's caustic soda unit. They said the fouling of a grinder resulted in caustic dust escaping into the air and causing damage to the paint and metal on their cars.

The circuit court ruled that the

company was not liable for damages, because there was no direct proof of negligence on the firm's part.

•

Sterling's Caribbean Victory: Sterling Drug (New York) has won a victory in Costa Rican courts in a damage suit brought against the firm by Farbenfabriken Bayer AG. (Germany).

The German company had sued to enforce a 1920 agreement between Sterling and I.G. Farben—the giant chemical cartel liquidated by the Allies after World War II. The agreement was one of a series adjudged illegal in 1941 by a U.S. federal court.

In a 43-page decision, Civil Court Judge Edgar Cordero Arias (in San Jose, Costa Rica) denied the German firm's petition and its claim for damages.

In Dec. '56, the Costa Rica supreme court upheld the constitutionality of that country's law authorizing the government to vest enemy alien trademarks during wartime. This decision established Sterling as the rightful owner of certain trademarks—including some Bayer marks—acquired after the war.

The German firm has said it will continue the litigation. Bayer spokesmen said the Costa Rican decision is "only a formality" and that Bayer is now appealing the case to a higher court in Costa Rica. Appeals of similar lower court decisions in Cuba and Nicaragua were reversed on appeal, they added.

LABOR

Productivity Peg: Further showing that labor unions are more likely than management to resort to specific productivity figures (*CW, June 22, p. 31*) is the current strike by a Canadian local of International Chemical Workers Union at Lever Brothers' Toronto plant. Aim of the walkout is to gain a wage "comparable to productivity," claims the local, asserting that productivity at the Toronto plant is higher than at the company's U.S. plants but that the basic wage rate at Toronto is 53¢/hour less.

•

U.S. Aid on Industrial Health: From two process industry union sources come suggestions for federal assistance in the field of industrial health and safety. At the second

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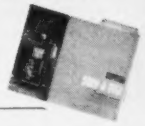

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annual radiological safety conference at Canisius College (Buffalo, N.Y.), Thomas Fee, Oil, Chemical & Atomic Workers Union international representative, proposed that the U.S. government assume responsibility for radiological safety in all plants using isotopes, appointing for each such plant a health-physicist who would set permissible radiation levels for plant areas and employees.

From Denver, the International Union of Mine, Mill & Smelter Workers executive board has sent to Congress a suggestion for a federal program, calling for inspection of mines, mills, smelters and refineries, conducting and coordinating research on industrial diseases, and federal aid to workers suffering from silicosis.

•

Labor Literature: Two recent publications of interest to industrial relations men: "The Grievance Process," published by Michigan State University's Labor & Industrial Relations Center; and "Legal Immunities of Labor Unions," by Roscoe Pound, former dean of Harvard Law School.

WIDE WORLD

LAWYER POUND: In labor laws, he sees unfair freedoms for unions.

Wages—Highest in South and West

Median hourly wage rate for workers in the soap and related products industry

SOURCE: U.S. Dept. of Labor's Bureau of Labor Statistics. Rates as of Sept. '56 and excluding overtime, premium pay and apprentices' wages.

	Northeast	South	North Central	West	U.S. Total
Number of plants	89	16	82	29	**216**
Number of workers	5,490	1,106	7,290	1,557	**15,443**
Median hourly wage rate	$2.04	$2.26	$1.99	$2.21	**$2.06**

Soap Pay Rate Decision Due

Hearings currently under way will determine, possibly within a month, whether soap and allied products manufacturers will have to pay a higher minimum wage to employees.

The U.S. Dept. of Labor is in the midst of an investigation—it began with hearings on June 18—to determine if, under the requirements of the 1936 Walsh-Healey Act, employees of the soap and allied products industry should have a minimum wage higher than the $1/hour required by the Fair Labor Standards Act. Similar determinations are under way for other process industries: drugs and medicines (hearing held April 2); and paint and varnish (wage survey nearly completed).

Walsh-Healey provides for the inclusion in every federal government supply contract in excess of $10,000 stipulations calling for the payment of prevailing minimum wages as determined by the Secretary of Labor.

Following the current hearings—with data and views presented by government, management and labor—the hearing examiner will prepare a proposal that will be published in the *Federal Register*. Interested parties will then have 20 days to file exceptions to the proposal. Secretary of Labor James Mitchell will then make a determination of the minimum wage—which will be reviewable in the courts.

One significant collection of data already presented at the hearing is the Labor Dept.'s Bureau of Labor Statistics wage survey, which reveals such information as the median hourly wage rate in the industry by regions (*see table*). The survey also itemizes the number of employees by regions, and the percentage distribution of workers by straight-time average hourly earnings. The survey covered 27,218 workers out of an estimated 27,713 in 206 of 216 plants.

Increase Could Be Costly: If an increase of, say, 5¢/hour is okayed by Mitchell, the result would be an immediate increase in pay for 1.6% of the employees in the soap and related products industry—the number now getting between $1 and $1.05/hour. Many higher wage rates then would have to be raised to maintain job differentials.

The last increase of this nature for the industry took place last year, when the 93¢/hour minimum—established some six years ago—was raised to $1/hour to conform with the Fair Labor Standards Act minimum as required by law.

The Walsh-Healey Act is administered by the public contracts division of the Dept. of Labor. That division and the wage and hour division were

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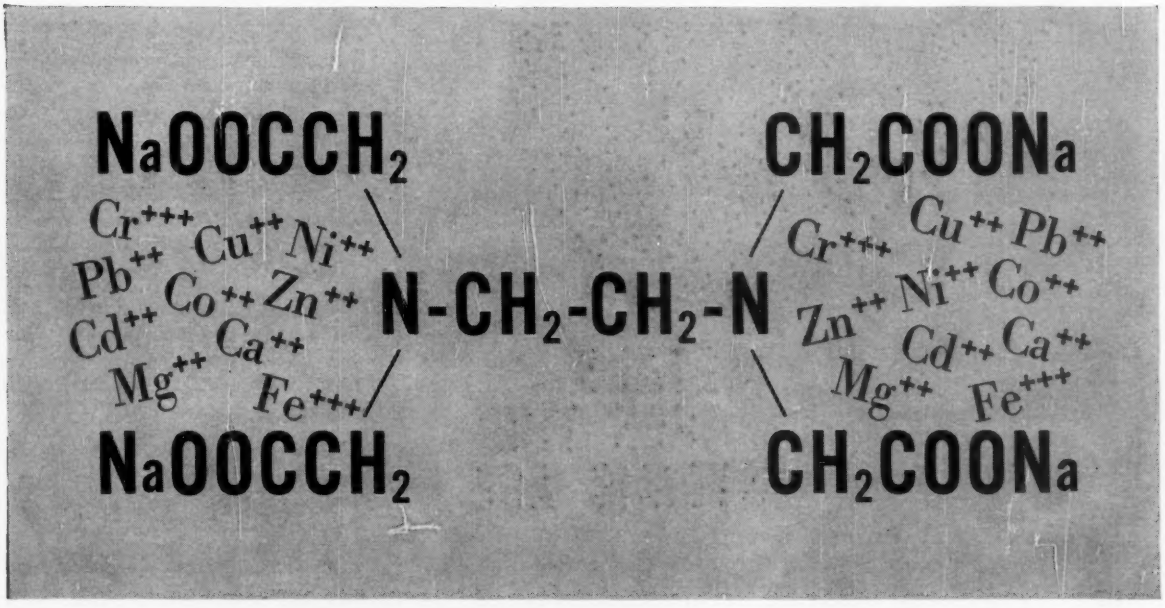

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ADMINISTRATION

consolidated in 1942 and placed under one administrator—currently Newell Brown.

Public contract division staffers say they aren't expecting any "real trouble" at the hearings. They explain that there has been no indication of any preparatory meetings or conferences among industry or labor. In fact, division officials say, the hearings should be rather short, despite the fact that unions are expected to argue for a minimum wage increase. The question, officials point out, is how much of an increase labor will want, and how much, if any, management and government will go along with.

KEY CHANGES

Erwin A. Olson and **James C. Konen,** to directors, Archer-Daniels-Midland Co. (Minneapolis).

Charles M. Spofford and **Walter W. Wilson,** to directors, CIBA States Ltd. (New York), and its subsidiaries CIBA Co. and CIBA Pharmaceutical Products.

Clement M. Brown, Jr., to regional vice-president-Europe, Olin Mathieson International Corp., subsidiary of Olin Mathieson Chemical Corp.

Richard W. French, Jr., to president, United Carbon Co. (Charleston, W. Va.).

W. A. Ackerman, to secretary, United States Borax & Chemical Corp. (Los Angeles).

Shadburn Marshall, to director of metallurgical research, Central Research Laboratories (Murray Hill, N.J.), Air Reduction Co.

Robert M. Briney, to president, Haynes Stellite Co., division of Union Carbide Corp.

Homer S. Myers, to vice-president for marketing, Tracerlab (Waltham, Mass.).

Gustave A. Wohlfort, to secretary-treasurer, and **Edward E. Langenau,** to vice-president, Fritzsche Brothers (New York).

DIED

Claude K. Boettcher, 81, board chairman, Ideal Cement Co. (Denver) and Potash Co. of America (Carlsbad, N.M.), at Denver.

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Technology
Newsletter

CHEMICAL WEEK
June 29, 1957

A new method of making superpure thorium metal will soon be in the news. The key: use of tetraiodide dissociation. Metal Hydrides (Beverly, Mass.) has quietly been perfecting its version of the classic van Arkel-deBoer process, will up output to limited commercial quantities (10 lbs./week) in the near future.

Similar to the tetraiodide routes previously considered for commercial use in zirconium (*CW, Feb. 2, p. 58*) and titanium (*CW, Aug. 18, '56, p. 58*) production, the MH process uses reactor-grade thorium as a raw material, converts it into "crystal-bar" metal of higher purity than has previously been available. MH has been selling developmental quantities (1 lb./week) for nuclear reactor and fuel element research at about $500/lb., expects to realize substantial cost reductions from the expanded operation.

•

Polycarbonates can be crystallized—within a range limited by their polymer characteristics—recent work by Farbenfabriken Bayer indicates. Crystallization can be used to obtain stronger, less-soluble resins.

A. Prietzschk, a chemist in the Bayer plant in Dormagen, has studied the polycarbonate crystals under X rays, feels they're rhombic in structure. Crystal density is about 8% higher than the density of the macroscopic material (1.20). Most probable structure is zigzag chains with each link consisting of two basic units. The linking of the molecule, he feels, is what accounts for the rigidity and heat resistance of the polycarbonates.

Previously, it had been thought that Bayer polycarbonates and those of GE were entirely amorphous. Also, Eastman Kodak has researched a whole range of crystalline polycarbonates (*CW, June 1, p. 57*).

•

General Mills won't produce Rilsan, the French nylon. After a careful investigation of the product (*CW Technology Newsletter, Jan. 12*), the firm decided that to make a go of the product, it would have to develop both textile and plastics applications. And it isn't interested in getting into the textile business. In its official statement, General Mills says it "genuinely regrets this conclusion, believes Rilsan to be an excellent product for both the textile and plastics industries."

•

A new method of recovering selenium from flue gas has reportedly been developed by the East Germans. The East German mining firm Mansfelder Huettenkombinat (Mansfeld) has started up a new distillation plant to make high-purity (99.99%) selenium from the anode mud of an electrolytic copper-refining operation. The firm also says it has developed a new way of recovering selenium traces from the flue. The new plant reportedly will be able to meet all East German needs for selenium.

Canada will make a vaccine to combat Asiatic influenza. The Connaught Laboratories (Toronto) has been ordered to start production. The new material will be added to Connaught's present flu vaccine to produce a polyvalent vaccine—one that's effective against both the current and the new strains.

In the U. S., on the other hand, the first production will likely go toward a monovalent vaccine (*CW, June 22, p. 38*) for military use. A polyvalent one will be made later.

Also from the Connaught Laboratories: a "quadruple vaccine," effective against polio, diphtheria, tetanus and whooping cough. Reporting on it to the Canadian Medical Assn.'s annual convention, Dr. R. D. Defries, director emeritus and consultant at the labs, said that the "technical difficulties have been largely solved." The vaccine is now under stability test.

In this country, the University of Michigan and the U. S. Public Health Service's Communicable Disease Center in Atlanta, Ga., are doing similar work.

•

A new process for desulfurizing iron has been worked up by Battelle Memorial Institute for Diamond Alkali. Molten iron and caustic are fed continuously into a chamber; desulfurized metal and caustic slag exit continuously into molds or ladles.

Substantial amounts of silicon can be taken out at the same time by introducing a stream of oxygen into the chamber. In lab trials, the process has been able to take out 90% of the sulfur. Battelle feels that it may be used in the production of ductile cast iron and in the desulfurization of pig iron prior to conversion into steel.

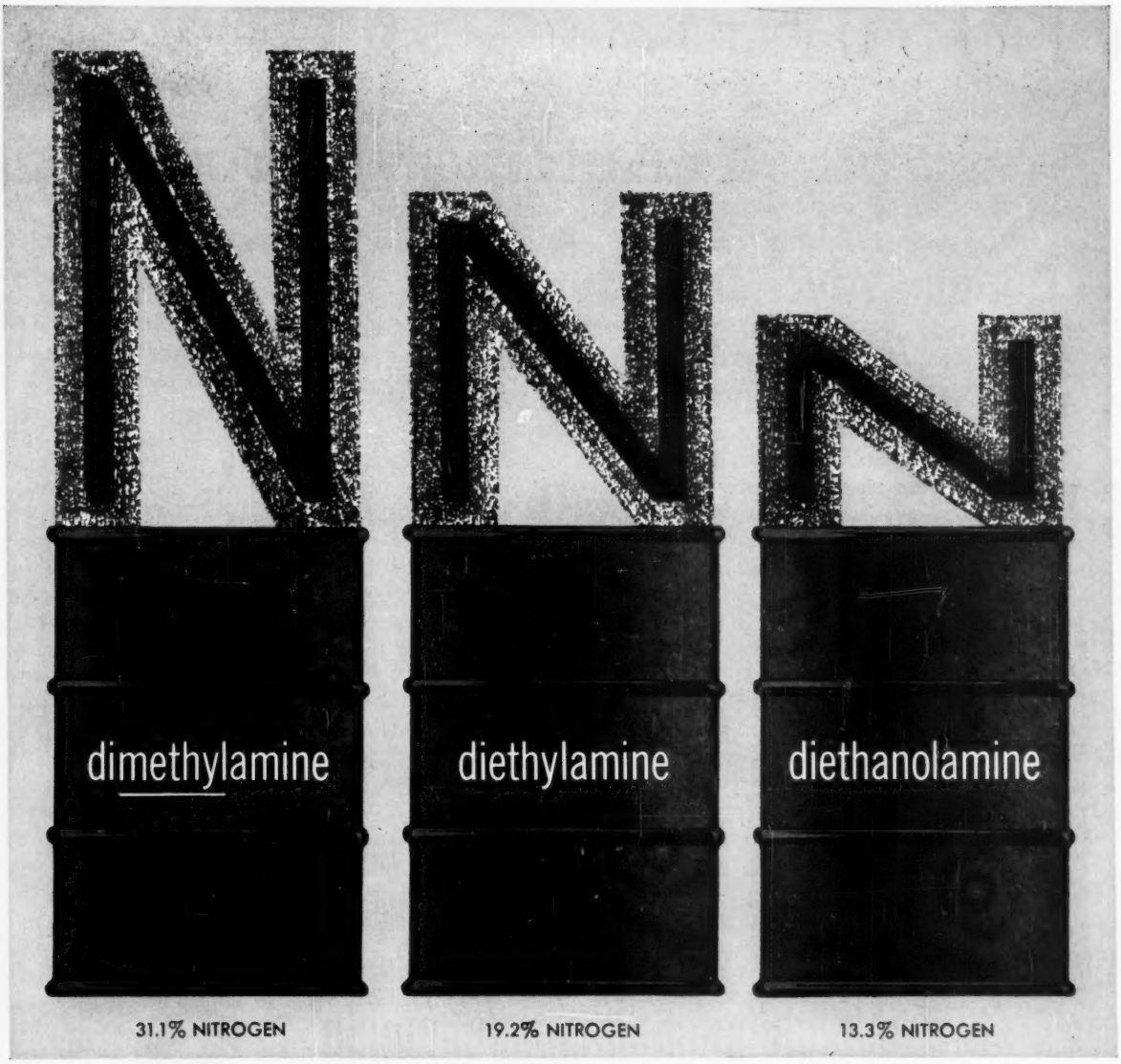
•

A new twist in fiber research is being taken by University of Illinois scientists. They're feeding raw sulfur to sheep—a technique that prevents shrinkage of the sheep's wool.

Apparently, the sulfur finds its way into the wool fibers to form a type of molecular bridge. Best results have been obtained when the amount of sulfur fed was less than 1% of the sheep's total food intake. The work has been under way there for about two years.

•

An antihistamine that up to now has been sold without prescription may turn out to be a potent mental drug. Bristol Labs found that its PRN (phenyltoloxamine) has exhibited action similar to reserpine but "with a notable absence of side effects." When research at Bristol indicated its promise as a mental drug, it was turned over to Marcy State Hospital (New York) for evaluation. To prevent misuse of the compound, Bristol has withdrawn it from over-the-counter sales.



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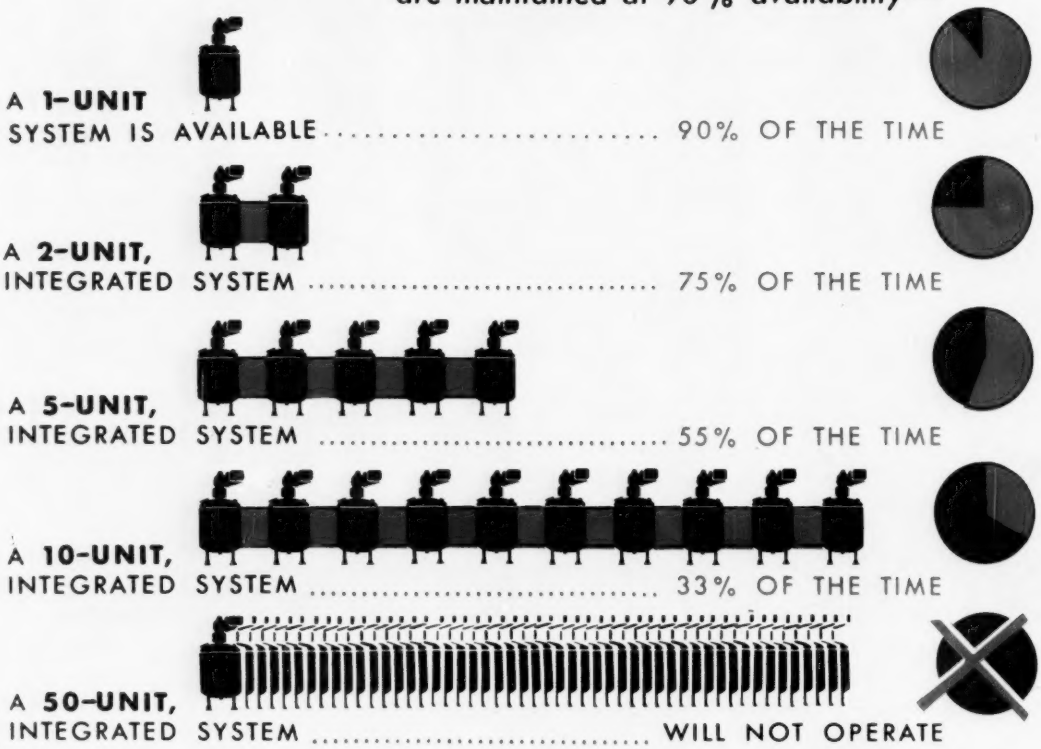
A 1-UNIT SYSTEM IS AVAILABLE ..... 90% OF THE TIME
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A 5-UNIT, INTEGRATED SYSTEM ..... 55% OF THE TIME
A 10-UNIT, INTEGRATED SYSTEM ..... 33% OF THE TIME
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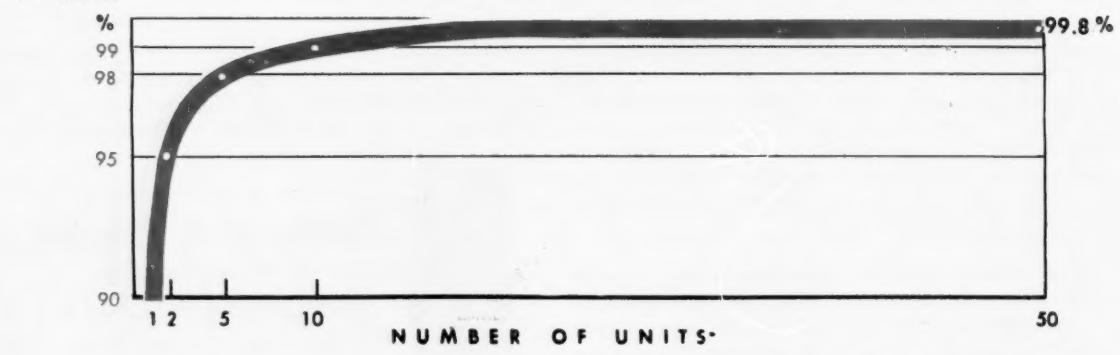
To keep these systems operating 90% of the time, maintenance must improve availability of individual units to...



Poses New Maintenance Demands

THE DATA on the opposite page point up one of automation's major pitfalls: although automation has become the magic word for increased production and lower operating costs, unless accompanied by more effective maintenance, it can have the reverse effect. That is the warning from Jesse C. Jessen of Du Pont's Engineering Service Division as he revealed to *CW* one of the firm's latest answers to the problem of obtaining more effective maintenance: lesson-plan maintenance training.

The plan is a feature of the division's program to improve the effectiveness of an already well-accepted training program for more Du Pont plants.* Behind the program: facts that point to a changing plant maintenance pattern. More and more, the responsibility for operational continuity is shifting from production to maintenance.

This change is clearly evidenced from a quick look at the figures. Du Pont's total wage roll has gone up 50% since 1940. In the same time, though, the maintenance wage roll has increased 125%. And it has increased 25% in the past six years alone. By far the biggest jump has been in instrument men, whose numbers have quadrupled since 1946.

Similarly, wages have gone up 60-70% for each mechanic in the past ten years, while over-all maintenance costs have risen more than 150%. Ten years ago, the ratio of labor cost to material cost was 40:60. Today, it's 60:40. And ten years from now, it's expected to be 70:30.

It would be difficult or impossible to remain competitive without automation. But by the same token, plant investment and protection of that investment becomes more costly in an automated plant. The average Du Pont investment per employee—$28,000 now—has doubled since 1944. In the newer plants, it is even higher.

Training's Answer: There are many facets to the solution of the increasing maintenance problems, of course. Improved equipment design, better planning of preventive maintenance programs are important, of course. But Du Pont feels that training is one of the most important, too.

The division's maintenance engineering section developed the basic training program six years ago, has been polishing it ever since. The latest wrinkle, less on-plan training, substitutes individual lessons for topics or chapters in a more formal maintenance manual.

Each lesson is put together so that it can be covered in a two-hour class. It deals with a piece of equipment or a type of operation. For instance, there are twelve on pipefitting, seven for centrifugal pumps, three for heat exchangers, one for steam traps. All told, there are over 400 topics.

Typically, a lesson on bearings covers hazards of maintenance work on bearings, types of bearing failures, causes of bearing failure. It would aim to teach the trainee how to spot faulty bearings.

What It Does: In many respects, Du Pont's training breaks with apprenticeship, specialization and ratio of classifications wherever possible. Starting from scratch, a mechanic can be trained in up to 500 classroom hours, an instrument man in 1,000 classroom hours. In contrast, the U.S. Dept of Labor standard for apprenticeships is 4,000 hours minimum.

Moreover, multiskills are stressed rather than specialization. In a highly automated plant, Du Pont feels, it is more effective for a mechanic to service a process rather than a single specialty for a larger area. Certain specialists (men with machining skill, for instance) are normally assigned to a central shop.

Assembling a Lesson: Most of the lesson units are prepared jointly with experienced plant personnel. In that way, maintenance information that's scattered throughout many references—or simply picked up on the job—is pulled together quickly and completely. In fact, the estimated time for preparing a single lesson topic is only 2½ man-days.

The idea in putting the lesson together is to make one that's easily digested by the student and one that maps out the material for the instructor, even to the extent of suggesting visual aids.

An instructor who spends as little as 15 minutes in preparation can teach the lesson adequately—provided he is familiar with the general subject. This time saving is important, for Du Pont depends on line supervisors to fit their teaching roles into their regular work schedules.

It considers it important to have the foremen train their own men, as it helps to build up confidence of the mechanics in their superiors. In addition, it helps the foremen retain and solidify their own knowledge of the subject.

The instrument course, however, is a big departure. Process fundamentals are stressed in addition to instrumentation topics. So if the plant cannot provide its own instructor, Jessen's group will provide one.

Setting It Up: Jessen emphasizes that their job is to provide assistance to the various Du Pont plants. His group does not direct the program. Each plant modifies

*The division's maintenance training program has assisted 34 of Du Pont's 79 plants with this type of program, instructs almost 1,000 of the firm's more than 12,000 maintenance men each year.

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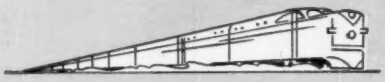

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the basic program as required to fit its needs and conducts the training sessions.

When a Du Pont plant decides to begin this type of training program, one member of Jessen's group—he always has a staff of four men working on training, none of them full-time—visits the plant to assess training needs. Maintenance of the actual process equipment in the plant is discussed with the foremen. Weaknesses in skills are charted and a tailored course is made up from the 400 lesson topics.

The plant instructors are selected, recruited, put through a 40-hour training program (four hours/day for two weeks) on how to train men. Toughest job: to teach the instructors the trick of shifting the burden to the individual trainee, getting discussion and demonstration participation without making the individual feel uncomfortable.

After giving tips on how to create the proper training atmosphere (e.g., a classroom where there will be no distractions, no smoking during class sessions, an opening-session speech by the plant manager), Jessen's group steps out of the picture.

The Pressing Need: The need for a training program at Du Pont is fairly obvious. In 1956 Du Pont plants needed 165 mechanics. But it could get only 70 experienced men. The rest had to be trained.

Moreover, the knowledge of the "old hands" must be refreshed, updated. Some skills, for example, are no longer frequently called for; others are in increased demand. (Du Pont finds that there is less need for lead burning, carpentry, bricklaying and blacksmithing. But there is urgent need for instrument men, increased need for welders, millwrights, pipefitters and electricians.) Moreover, new skills must be developed. In several Du Pont plants, for example, plastic piping is used extensively. This calls for completely new working techniques.

Program Payoffs: And the program pays off in other ways. It gives the plants another basis for judging advancement, doesn't leave it completely to foremen's opinion, or length of service (both of which are, of course, important).

Another side effect is the improvement in safety records. Du Pont's records show that men trained in the program had only one-tenth as many ac-

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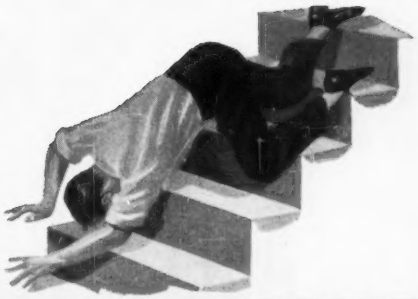

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cidents as those who hadn't participated.

Jessen explains it this way: "We can't claim that the program is entirely responsible for the better safety record. But we know the man has been helped by learning the 'why' of what he's doing. And his morale is improved."

Lessons from Lessons: Not every company need go to the lengths that Du Pont has in setting up its training program. But there are some elements in the lesson-plan approach that could have universal application.

A cheaper alternative for a smaller company or single plant might be to hire a full-time instructor. But when the instructor leaves, the program would grind to a halt. With a simplified lesson-plan manual, there is less chance of program interruption once a backlog of lessons has been built up. This is an important consideration today, with high pressure being placed on solving maintenance problems.

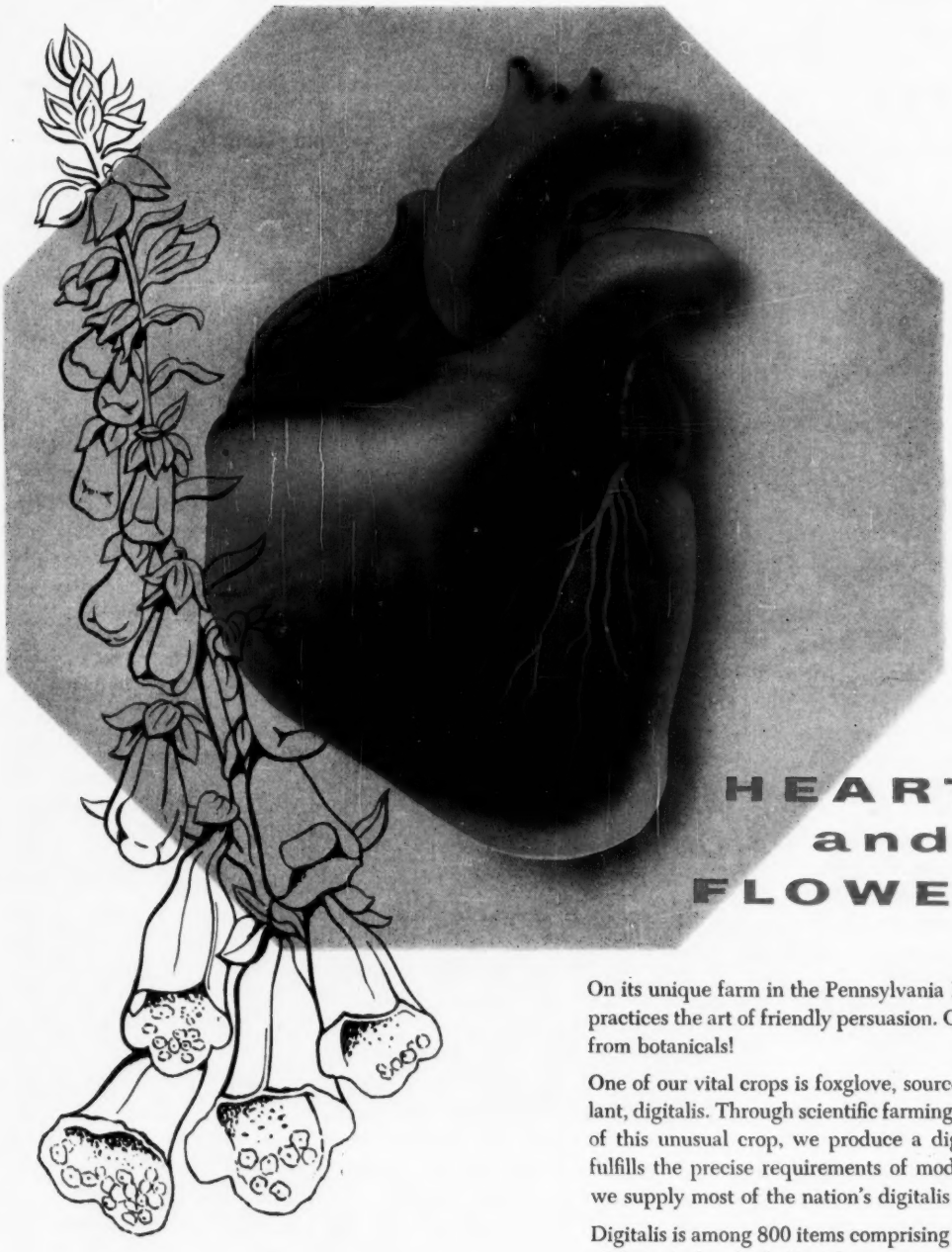
Pocket Page Speeds Plant Calls

When the receiver buzzes in Milton Moore's pocket, he hops into his electric car (*above*) and heads for the nearest plant telephone.

This happens many times a day at Parke, Davis's Detroit plant, where Stromberg-Carlson's page system was installed a few weeks ago to upgrade communications to the efficiency level required in the modern process plant.

Moore, the power plant area engineer, like the 26 other key maintenance and service people equipped with the pocket-size page masters, services 68 buildings in a three-quarter-mile square area — often can't be reached by phone. Now, instead of sending out a special messenger to find him, the page-system switchboard is called. The operator dials Moore's page-master code number, relays the message to him as soon as he reaches the nearest interplant telephone.

Parke, Davis is adding further key production men to the system. With some 5,000 individual pieces of machinery in the plant, the economy of avoiding machine downtime is obvious, says Peter Kenyon, electronic section manager.



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Maintenance Handbook: Want to know more about maintenance training (*p. 64*) and hundreds of other maintenance subjects? They're all included in the big, first edition of "Maintenance Engineering Handbook" (McGraw-Hill Book Co.), recently off the press. Edited by L. C. Morrow, former chief editor of *Factory Management and Maintenance*, the handbook was written by 75 specialists in various phases of maintenance engineering. It pulls together into one reference work subjects that previously could be found only in a number of places. In addition to equipment, buildings and materials maintenance, the book covers fully the management end of maintenance.

•

Electrical Maintenance: General Electric offers pointers on how to organize an electrical maintenance program to meet the demands of automation in a new booklet, "Five Steps to Productive Maintenance." GE recommends enlisting the services of local GE service shop maintenance specialists to simplify setting up the program, which includes gathering equipment data, determining routine maintenance required, establishing a control system, evaluating critical maintenance work, establishing a critical maintenance program.

•

High-Speed Mixer: For continuous, fine-finish mixing of ingredients that can be broken and dispersed by paddles, The Strong-Scott Mfg. Co. (Minneapolis) has come up with the Turbulizer, a new high-speed mixer. The unit is also recommended for fluffing of powdered materials and for adding small amounts of liquids to a dry mix. Adjustable-pitch paddles control output—maximum capacity: 10,000 lbs./hour. Turbulizer uses a 10-hp. motor, can accommodate up to 20 hp. for hard-to-handle materials, may be jacketed for heating or cooling. The mixer is self-cleaning.

•

Wet Dust Collector: Joy Manufacturing Co. (Pittsburgh) recently introduced a wet dust collector that is one-tenth to one-twentieth the size of comparable units. Called the Microdyne, the collector has the highest efficiency of any wet-type unit, Joy reports. Cited as other advantages: low initial cost, low operating cost, ease of maintenance, long life, low water rate. The unit fits directly into existing duct work at the point of use.

•

Emergency Lighting: For emergency use in large areas, Safety-Sun Glass Division of American Optical Co. (Southbridge, Mass.) offers its Model 300X Sentry-Lite. Three 5,000-candle-power sealed-beam lamps provide six hours of lighting. An automatic recharger, operating on standard electrical power, keeps the battery at peak capacity. Over-all dimensions: 8 x 10 x 13 in.

Temperature-Measuring Selector: A new line of push-button selector switches for temperature-measuring circuits is available from Thermo Electric Co., Inc. (Saddle Brook, N.J.). The switches permit checking from 12 to 72 thermocouples or resistance bulbs from one location, make possible the averaging of temperatures from a number of sensing elements. They can be used with all types of pyrometers—millivoltmeter or potentiometer—and resistance thermometers. Case is dust-tight and moistureproof.

•

Overload Control: Assembly Products, Inc. (Chesterland, O.), has developed a new "fail-safe" overload control that it reports combines accuracy and adjustable load limits with continual indication of motor load. Dubbed Load Sentry, the control uses no electron tubes, is based on positive action of a contact meter-relay. Dial range is from 0 to 150% of normal motor load. Interlock keeps circuits broken until overload condition has been corrected, manual-reset button is pressed to restart motor.

•

Dehumidifier: Dryomatic Corp. (Alexandria, Va.) is out with a new, Model 105, dual-tower dehumidifier that uses silica gel as a drying medium. Designed primarily as a space dryer to maintain humidities down to 10% in areas as large as 35,000 cu. ft., the unit will provide low-dew-point air for processing applications, can be used alone or in combination with cooling equipment in air-conditioning systems. Silica gel is regenerated automatically by electric heating elements in one tower while the other tower continues to supply dry air. Unit has a dry-air output of 100 cu. ft./minute, will remove 50 lbs./day of water.

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Air Compressor: Gardner-Denver Co.'s (Quincy, Ill.) new Model WBN air compressor is a high-capacity unit designed to save floor space. The two-stage package unit occupies 34 sq. ft., is rated at 200 hp., 1,150 cfm., requires no special base for mounting.

•

Atomic Energy: Control-rod drive mechanisms for positioning the rods in the reactor core are now manufactured by Marvel-Schebler Products Division of Borg-Warner Corp. (Chicago). First units—weighing 450 lbs., tubular in shape and about 7 ft. long—will be used in the Shippingport PWR.

•

Filter-Pump: Sel-Rex Corp. (Nutley, N.J.) makes a new portable, liquid-clarification filter with a special bypass valve that allows the unit's pump to be used for solution transfer. Tagged Model BS-3, the filter uses an annular stainless-steel-mesh element that lifts out for easy cleaning or quick replacement with a standard porous-stone membrane. Unit is 36 in. high, requires 1½ sq. ft. of floor space, has a capacity of 800 gal./hour.

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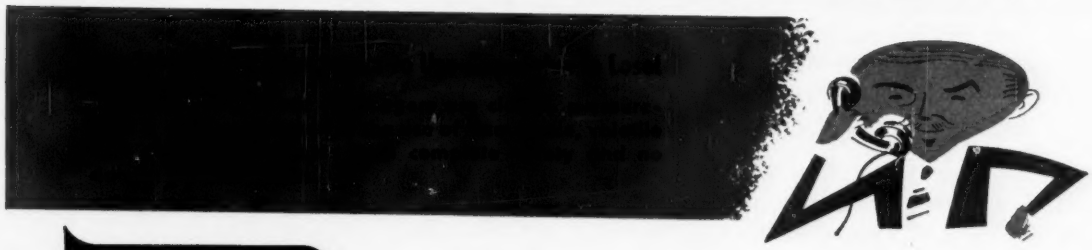

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Squibb's new hormone is latest steroid to show promise as an anticancer chemical.

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- **folic acid antagonists**
- **amino acid derivatives**
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Chemicals Close In on Cancer

THE financial world fairly shook last week when word leaked out that E. R. Squibb & Sons was working on a chemical that showed promise in treating cancer (*CW Business Newsletter, June 22*). But seasoned chemical researchers took the news a lot more calmly. To them, it was merely another piece of evidence to shore up their belief that the chemical approach would be the one that would lead to the ultimate control of cancer.

Not Ready Yet: Although the news of Squibb's development was enough to send Olin Mathieson's stock up briefly, Squibb itself went to great lengths to play down the development. The compound, it said, was more a palliative than a cure.

The drug is now undergoing clinical evaluation at the Sloan-Kettering Institute for Cancer Research (New York), University of Miami medical school and Jackson Memorial Hospital in Miami. Moreover, the compound will get further investigation at the studies panel of the Cancer Chemotherapy National Service Center, National Institutes of Health (Bethesda, Md.).

The exact identity of the drug has not been reported. But it's believed to be related to progesterone, a female sex hormone (two possibilities: 9-α-bromo-11-ketoprogesterone or 9-α-bromo-11-oxyprogesterone) That such a compound would show anticancer activity is not surprising, for steroids have long been recognized as possible cancer weapons.

Literally hundreds of steroids, turned out by a clutch of drug firms, have been or are currently being screened for anticancer properties. And some of these have shown promise. Upjohn's Halotestin (9-α-fluoro-11-β-hydroxy-17-methyl testosterone), for example, has reportedly effected remission of breast cancer in some cases.

Giant Step: So far, anticancer chemical research has been limited by the fact that relatively few of the compounds screened have been tailored expressly for potential use as tumor-thwarters. Thousands of the compounds evaluated have originated in other forms of research, were turned over for screening on the bare hope that they might prove useful. While screening laboratories (e.g., Sloan-Kettering) welcome such compounds, relatively few of the latter have shown promise.

Now, a new contract between the Cancer Chemotherapy National Service Center and Stanford Research Institute (in collaboration with Sloan-Kettering) (*CW, Technology Newsletter, June 1*) will help alleviate this situation. First and largest of its kind, the contract will cost $450,000/year (supported mostly by the center). Under its terms, SRI will systematically seek out potentially useful cancer drugs, plan their design and synthesis. Emphasis, however, will be on antimetabolites, research on chemicals that block the abnormal growth of cancer cells without affecting normal cells.

Other Irons: There's a massive screening program, of course, that's sifting out all types of potential cancer drugs (*CW, July 24, '54, p. 74*). And there have been any number of ones that have showed some activity in controlling it. The government's center at Bethesda—which spends $20 million of the government's $46 million/year Cancer Institute budget—has many chemotherapeutic irons in its fire. For example, it has had screening contracts for some time with Hazleton Lab-

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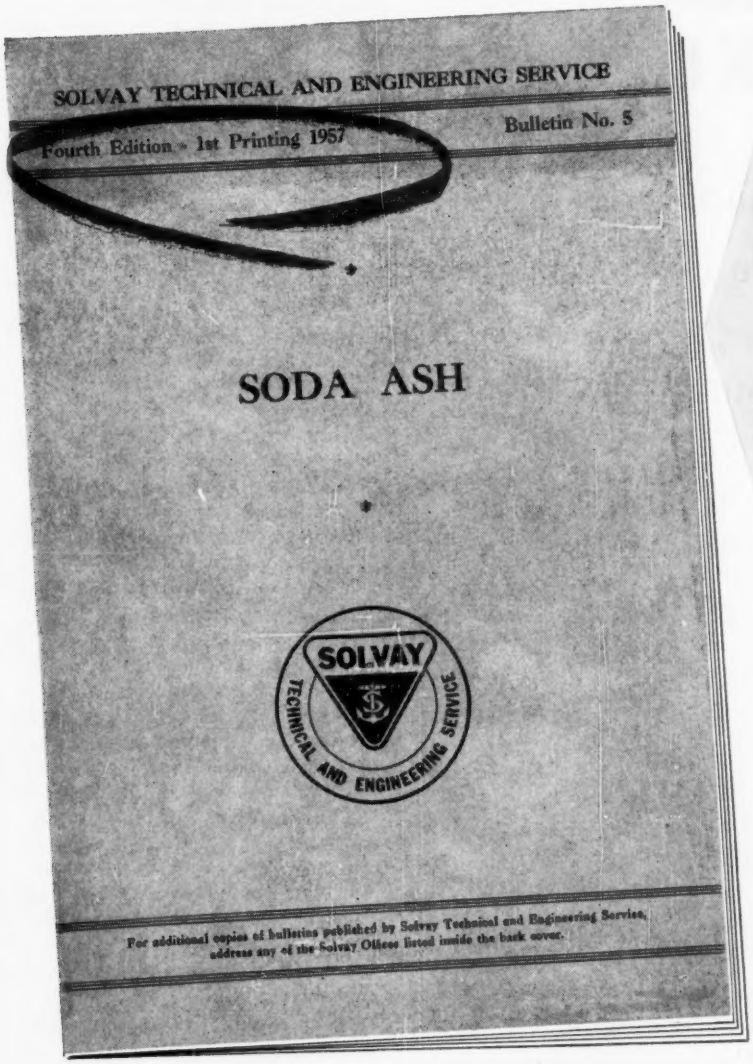
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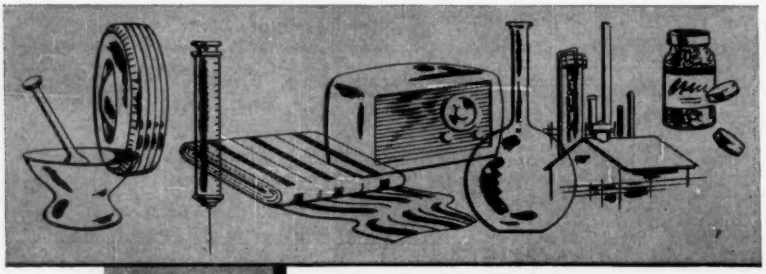

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oratories (Falls Church, Va.); Arthur D. Little, Inc. (Boston); Microbiological Associates (Bethesda, Md.); Southern Research Institute (Birmingham, Ala.); Stanford Research Institute (Menlo Park, Calif.) and Wisconsin Alumni Research Foundation (Madison, Wis.). And chances are growing that under government auspices, both the preparation and screening of potentially valuable compounds will be stepped up by drug makers and others *(CW, May 18, p. 84)*.

The SRI program employs 25 staffers, is headed by senior chemist Bernard Baker and group leader Leon Goodman. Its objectives:

- To synthesize new organic chemicals that are potentially useful to the program.
- Analyze the new compounds to verify their composition.
- Prepare them in quantity for testing at Sloan-Kettering and other institutions participating in the broad NCI-sponsored program. Toward this end, SRI has already built and equipped a special $40,000 laboratory.

To date, the bulk of anticancer chemical research (excluding the cut-and-try sifting of thousands of compounds for anticancer activity) has been aimed at studying the synthesis of nucleic acids and how to block the latter's formation. Reason: formation of nucleic acids leads to formation of cells. Since one cancer trait is abnormal and uncontrolled increase of body cells, the blocking of nucleic acid formation is believed to perform a key part in controlling cancerous cell growth.

The California researchers, however, intend to concentrate on another chemical factor in cell formation—coenzymes—which, like nucleic acids, also are involved in cellular reactions (e.g., fat synthesis and breakdown, carbohydrate synthesis and breakdown). Their premise: studies of coenzyme formation concern a primary effect; nucleic acids only a secondary effect. That's because coenzymes are required for the formation of nucleic acids, but new nucleic acids aren't required for the formation of coenzymes.

Three Approaches: SRI will concern itself with synthesizing three different types of compounds:

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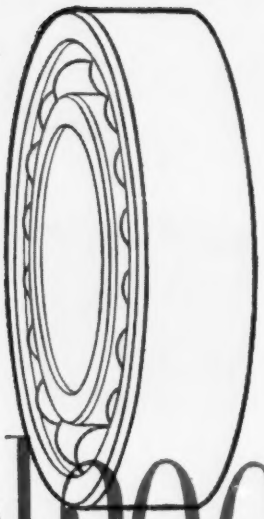

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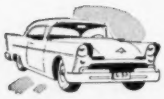

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known as "fraudulent" coenzyme precursors—which result in coenzymes having unusual chemical composition. Such coenzymes will be incapable of synthesizing cells, are intended to slow or halt cell reproduction. The bulk of SRI's work will be in this area.

• Nucleic acid antagonists. While Baker doesn't feel that nucleic acids play a major role in cancer chemical research, he's fully aware that some other experts do. He therefore intends to spend some time on developing "fraudulent" precursors for nucleic acids. Specifically, he will seek methods of producing deoxyribose nucleosides (DRN), will attempt to replace the natural base in DRN with such compounds as 8-azaguanine.

• SRI, later on, will try to make anticoenzymes. These are different from the antagonists in that they completely block the synthesis of coenzymes (by preventing utilization of precursors) rather than alter the coenzyme that is produced. While anticoenzymes are a logical target, they're low on the SRI agenda. Reason: the compounds are extremely difficult to make, knowledge of their chemistry is not far advanced.

Main Goal: Right now, SRI's approach is to vary the makeup of the nucleosides, nucleotides, B vitamins, glutamine, and nonessential amino acids that are used in synthesizing fraudulent coenzyme precursors.

Sulfur- and nitrogen-substituted forms of nucleosides will be made starting with purine. Such compounds have shown anticancer properties (e.g., Lederle's Puromycin). The trick lies in making the substitutions at the right chemical positions (the three prime positions of the nucleoside sugar's ribose group). In previous research, substitutions on the 2- and 5-positions of the ribose group gave inactive compounds.

Nucleotides of the base-ribose-phosphate type will be altered in the phosphate group. There's no evidence, yet, that this will result in anticancer activity. But that doesn't preclude an anticancer possibility, Baker feels.

Synthesis of fraudulent coenzyme precursors from B vitamins will stress riboflavin and folic acid. For example, the SRI researchers will attempt to make a riboflavin that does not have an oxidation-reduction action, its normal role in cellular synthesis. And from folic acid and tetrahydrofolic

acid, they'll try to make compounds that interfere with formate transfer, also important in cellular synthesis.

From glutamine (an amino acid) Baker will attempt to make fraudulent coenzyme precursors in which amide nitrogen is replaced by other groupings (azaserine is an example—but there may be more effective analogs that haven't been made and evaluated).

Finally, SRI will work with nonessential amino acids, try to build likely agents derived from cysteine, serine, etc.

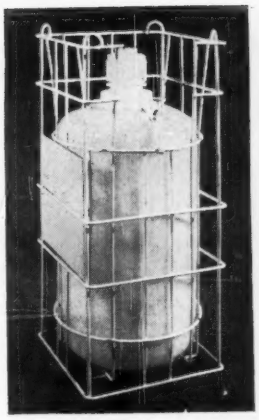
Once SRI has learned to synthesize promising compounds, they will be screened on mice, be evaluated further for other properties (e.g., antibacterial) by pharmaceutical firms.

Thorny Road: Chemical treatment of malignant cells is complicated by the fact that over 300 different types of human cancer cells are known to exist. And ideal agents will have to be highly selective, avoid damage to nor-

Research Offshoot

At Quaker Oats Co.'s Barrington, Ill., laboratory, H. R. Heinecke holds two unexpected dividends from the firm's food research. At left is a "Barrington Brown," representing a new strain developed at the laboratory. Cat fanciers like the novel breed, which may be marketed eventually. At right, the descendant of another lab cat that, despite its uncertain breed, won the pictured blue ribbon in a national cat show.

Jobbers and Users of liquid Chemicals find "STEEL-X" Carriers safe, durable, easy to handle and time saving. You can stock 65% to 100% more of these welded steel rod carriers in storage space previously used for wooden crated carboys, and storage space is costly. Loading and unloading time is greatly reduced. Low tare weight (less than 30 lbs.) means savings that soon pay the cost of the carriers.



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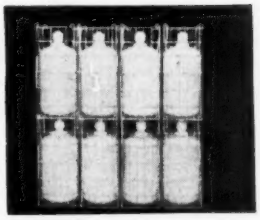
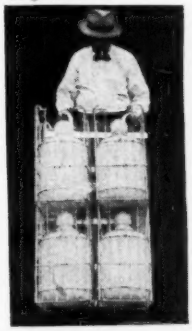
offer the Practical Way to effectively cut the costs of distributing liquid chemicals



You can easily stack this carrier 2, 3, or 4 high. Available in 5, 6½ and 13 gallon sizes.



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An unbreakable, puncture resistant Polyethelene bottle used with the carrier comprise the most modern package of its kind. This carrier being designed for easy handling, filling, shipping, receiving, storage and pouring means trouble-free distribution of liquid chemicals over old wooden crated carboys.

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Our 16mm film which runs for 8 minutes will give you a complete picture of the great value of this carrier. Simply ask to borrow it. We will gladly answer all questions and provide Chemical Distributors with complete details upon request.

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☐ Technical Bulletin on Pelargonic Acid
☐ Use of Pelargonic in High-Baked Enamels

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mal cells while exerting their therapeutic power.

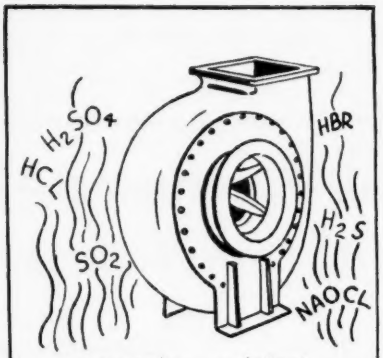
It's always possible, of course, that an entirely new route to cancer chemotherapy may turn up. Recently, such a possibility opened up in the finding (by R. A. Holman of the Welsh National School of Medicine, Cardiff) that administration of 0.45% (by weight) hydrogen peroxide in water resulted in "marked clinical improvement" in two of four humans having very advanced inoperable tumors.

Last Resort: Baker, himself, points out that surgery and X-ray treatment, which now cure about a third of all cancer cases, are approaching a limit —"the 35% asymptote." Despite the therapeutic potential of virus, radiation, and immunological treatment, he is convinced that chemicals offer the best hope for an eventual cure. Reasons Baker, "Anything that goes on in the formation of cells involves chemistry. That's why the chemical approach is so important in trying to solve this problem."

To scores of seasoned cancer chemotherapy researchers, there's no fault to find with this philosophy.

Energy Saver

Big savings (80%) in both initial cost and energy requirements over competitive equipment are claimed for this new laboratory emulsifier. Named the Minisonic, it's offered by Sonic Engineering Corp. (Stamford, Conn.), works by forcing liquids at high pressure over a razorlike blade, emulsifying them by ultrasonic vibrations set up in the blade.



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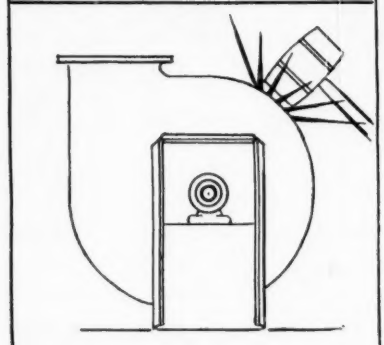
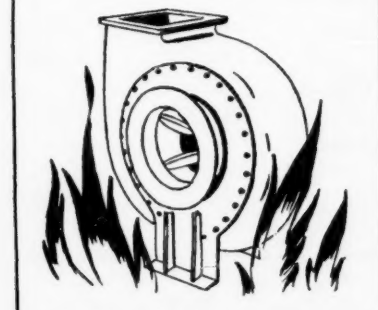


impact-resistant



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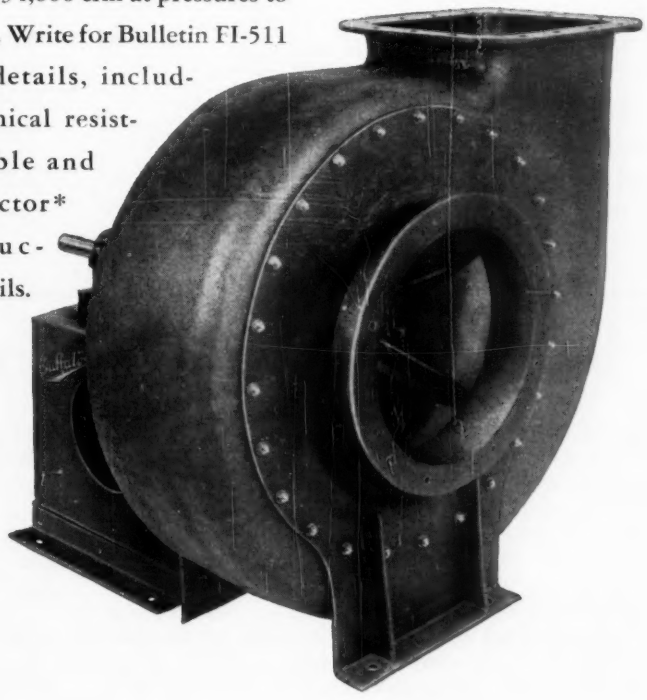
"BUFFALO" RESIN-BONDED FIBER GLASS FUME FANS

These new fans further broaden the selection of "Buffalo" exhausters for the chemical industries, and offer advantages of versatility, lighter weight, reasonable cost and reliability.

The new Type "FG" offers excellent chemical resistance to a wide variety of acids, salts, gases, organic materials and other corrosives. It is suitable for temperature applications up to 225°F.

The fan housing is entirely of resin-bonded fiber glass, with stainless steel studs molded-in for attachment to the bearing stand. The rotor is a carefully balanced steel wheel with all exposed parts encased in thick fiber glass. In standard capacities up to 34,000 cfm at pressures to 10″ static. Write for Bulletin FI-511 for all details, including chemical resistance table and "Q" Factor* construction details.



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Britain's 46 Principal Chemical Purchases—

IN '56, IMPORTS OF 27 PRODUCTS WERE DOWN FROM '55,

Item	1955	1956
	(Value in £)	
INORGANIC:		
Acids	310,148	181,420
Aluminum oxide abrasives	1,714,933	1,480,541
Arsenic trioxide	234,626	191,935
Borax, refined	895,082	887,655
Calcium chloride	2,439,516	1,985,622
Carbon blacks, charred	1,395,724	900,383
Other carbon blacks, not acetylene	472,781	342,075
Iodine	592,124	236,507
Carbonates	332,593	278,261
Other potassic compounds, not including fertilizers	410,751	344,729
Silicon	1,196,964	910,983
Chlorates	314,960	280,282
Sodium compounds (not elsewhere classified)	1,197,232	1,101,825
ORGANIC:		
Acids, anhydrides plus their salts and esters	2,319,028	1,888,121
Menthol	409,330	205,115
Vinyl acetate monomer	1,428,570	1,338,386
Organic compounds, n.e.c.	13,369,141	11,783,962
Tanning extracts	4,113,295	3,125,532
Pigments, including titanium dioxide	1,540,512	1,480,229
Vitamins, plus salts and esters	1,775,575	1,539,548
Alkaloids	1,507,485	925,416
Proprietary medicines	482,010	475,818
FERTILIZERS:		
Potassium sulfate	274,697	263,355
PLASTICS MATERIALS:		
Vinyl resins	2,957,505	1,747,338
Molding powders	1,710,367	502,417
Sheets, rods, tubes, film foil, etc.	5,552,926	5,466,329
Disinfectants, insecticides, weed killers, and cattle dressing	1,147,508	1,010,042

In British Expansion—a Shrinking Market

FOR MOST segments of the British chemical industry, '56 was a peak year, and '57 may well topple the highs set then. Indications are that British firms making chemical and allied products will lay out 23% more in capital expenditures during '57 than they did in '56. What does it mean to U. S. and other world chemical sellers? For one thing, there's the likelihood that their sales to Britain will not be as high in '57 and successive years as they were even in '56. Where last year, 27 of 46 categories of imported chemicals showed a decrease from '55 import levels (*table*), a similar '57-'56 comparison will almost certainly show decreases in more categories. With the increasing rate of investment in new British chemical facilities, production will be able to meet more of the country's domestic demands.

Highest rate of expansion in Britain's chemical industry in recent years will continue to be in petrochemical items. Some £45 million is believed to have been set aside for construction of additional facilities—this would double the rate of investment over a period of 2-3 years. Projects scheduled for completion by '59 will increase British refining capacity (basis of the petrochemical expansion) from 29 million tons/year to a high of 39 million tons.

These projections and a detailed review of the British chemical industry are incorporated in the just-published May issue of the U. S. Commerce Dept.'s industry report on chemicals and rubber. The survey is based on a report from the American embassy in London.

Larger Ahead: Constantly growing demand for all chemicals is attributed as the chief reason for current and planned expansions in British petrochemicals. One of the largest such expansions is Imperial Chemical Industries' program for the future—it goes well beyond the one lined out about a year ago (*CW, July 14, '56, p. 85*).

During the next several years, ICI plans to invest £160 million in new projects that are slated to slash production costs. Polyethylene output, for example, will be upped to 90,000 tons/year by '59.

AND 19 WERE UP	1955 (Value in £)	1956
INORGANIC:		
Silicon carbide abrasives	1,133,435	1,183,749
Mercury	1,225,988	1,627,139
Sodium, calcium, potassium, lithium	755,048	1,025,959
Selenium	526,035	1,177,554
Phosphates	22,141	97,048
Inorganics, n.e.c.	2,687,163	2,706,584
ORGANIC:		
Glycerine	700,414	735,929
Naphthas; alcohol derivatives, mixtures	1,712,917	2,482,259
Glycol ethers, esters	452,065	554,235
Sodium compounds	825,441	1,131,151
Styrene monomer	1,603,785	1,884,640
Dye intermediates	502,820	524,524
Synthetic dyes, compounds	2,414,774	2,727,155
Pigments, paints, etc., n.e.c.	534,657	672,633
Antibiotics	488,414	781,962
FERTILIZERS:		
Basic slag	655,701	737,078
Potassium chloride	8,060,119	9,099,982
Other fertilizers	523,418	1,365,310
PLASTIC MATERIALS:		
Synthetic resins, except vinyls	1,808,362	2,933,234

for U. S. Chemicals

Other expansion plans, according to the embassy report, include the investment of £20 million by Shell Chemical, and Monsanto's intention to expand facilities to increase production by 60%.

But somewhat tempering this air of confidence is the industry's immediate concern about the continuing pressure on profit margins. And during '57, competition is growing stronger rather than abating.

The report points out that although the British chemical industry was one of the first to accede to a government request not to initiate any price increase, "many manufacturers are doubtful whether additional pressure, including increased transportation costs, can be absorbed."

Further, the industry is keenly aware of the ramifications of export sales price hikes. Consensus is that unless the "steady rise of production costs is halted, chemical producers may soon face an increasingly difficult period abroad."

Would such ramifications drive Britain into the so-called "common market" in Europe? There appears to be almost general agreement that it would be a serious blow to British chemical exporters if the United Kingdom remains outside a European free-trade area, the report states. Prospects of competing with Continental producers, particularly those in Germany, however, "were viewed with mixed feelings, especially [considering] the likelihood of increased prices at home."

'56, a Good Year: But confidence in the ability to withstand growing competition this year is greater because of the British chemical industry's foresight and planning, and the extensive use of advanced manufacturing techniques. Too, the industry's efficiency and its good '56 labor-productivity record helped to brighten earlier anticipations of business for the year. For instance, a considerable slump in the cotton textile and related industries caused a marked cutback in demand over a wide range of chemicals; the situation showed some improvement at the end of the year, but there was "no indication that the recovery was more than temporary."

Complete production figures aren't available, but the report estimates that British chemical output in '56 was about 5% above the '55 figure. Here's a rundown on how important segments of the industry fared last year:

Heavy Chemicals Active: In general, the heavy-chemicals sector had a fairly active year. Indicative of the high level of output: sulfuric acid production. Output of the acid and oleum in '56, exclusive of that from government plants, totaled a shade over 2.25 million long tons (on a 100% H_2SO_4 basis), compared with slightly less than 2.09 million tons in '55. Titanium oxide production climbed to third place among sulfuric outlets—next to superphosphate and ammonium-sulfate industries—taking 273,646 tons in '56, some 42,000 tons more than in the previous year.

New heavy-chemicals plants or expansions included an installation for the manufacture of 4-5,000 tons/year of lampblack; a plant to produce activated carbon from peat; increased production of hydrogen peroxide; the National Coal Board's opening of facilities to process by-products of coal to yield sulfuric acid, ammonium sulfate, coal-tar aromatics; a large expansion in capacity for producing oxygen.

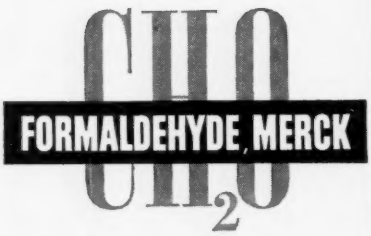
In addition, Harshaw Chemical established a wholly owned subsidiary to develop electroplating processes and production of needed chemicals. Another company scheduled expanded production of liquid chlorine to 30,000 tons/year and caustic soda to 35,000 tons.

Fertilizers Freer: In general, the supply of fertilizer materials was easier during '56, although the political situation in North Africa—the U. K.'s major source of phosphate rock—caused some concern among importers. Heavy spring demand for ammonium sulfate brought about a temporary shortage that was alleviated by purchases on the Continent.

Farm income has been declining in Britain (as in the U.S.), but fertilizer consumption is rising (*see table page 82*). The British government subsidized nitrogenous and phosphatic fertilizers last year, but not potassic materials.

The U. K. produced a "substantial surplus of nitrogenous materials in '56," but there was no oversupply in Britain, since export prices were higher than the prices

From the World's Largest Production Unit



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CHEMICAL WEEK BUYERS' GUIDE

Published September 14
Closing ROB July 1
Catalog Inserts August 1

Fertilizer Deliveries in the U. K.
(long tons)

Product	Fertilizer year 1954-55	1955-56
Nitrogen (N content)	248,100	291,300
Phosphates (P_2O_5)	334,600	385,900
Potash (K_2O)	252,400	305,500
Total	835,100	982,700

for its products on the home market.

Organics Surging: Petrochemicals, as noted, continued to be the most rapidly expanding sector of the British chemical industry. This group, says the report, was the source of about one-third of all the organic chemicals produced in the U.K. in '56. Stepped-up capacities were announced for phthalic anhydride, maleic anhydride and cyclohexylamine. Construction of a plant for making lube oil additives (copolymers of methacrylic esters) and the opening of Armour Chemical's first European plant (cationic and nonionic chemicals) were also on the '56 expansion list.

Also, two new synthetic-detergent raw-materials plants were opened last year—one will produce 10,000 tons a year of high-quality alkylate, which will knock out imports of the material; the other, completed by Shell Chemical in Aug. '56, has a capacity of 30,000 tons/year of dodecyl benzene—about 13,000 tons/year of the output is expected to be exported.

Plastics Push: Rate of production in the plastics industry slowed appreciably in the first half of '56, compared with the same period in '55, but a pickup in demand during the last quarter of the year pushed plastics output to a record 335,000 tons, some 10,000 tons higher than in '55. Competition increased in home markets and abroad, though, and brought about a reported slicing in profit margins. Stiff competition (from Germany and Italy) caused considerable concern in vinyls. The '55 exports of the latter hit about 13,000 tons, and this level was barely maintained last year.

The C&R report notes that one significant development in the British plastics field was the expiration (in Feb. '56) of ICI's patents on the high pressure process of making polyethylene. With the expiration, several firms have announced entry into polyethylene. ICI opened a new plant that ups its polyethylene capacity to some 45,000 tons/year, and also started production at a second oil-cracking plant that doubles its output of ethylene to 100,000 tons/year. Under construction is another ethylene glycol plant, which will also produce ethylene oxide, bringing total ICI ethylene capacity to about 16,000 tons/year.

Also in the works are plans of two British firms to put up styrene monomer plants. In the past, styrene production in Britain hasn't been large enough to satisfy domestic demand; imports from the U.S. were needed. The new plants foreshadow a definite reduction in such imports.

Foreign Bucking: Although foreign competition for Britain was more intense last year than in '55, total value of exports was higher; the rate of increase, however, was less. Exports of chemicals and allied products in '56 amounted to £246 million, about £13 million higher than in '55. These exports were equivalent to 7.7% of all exports of British manufactured goods. (Total value of chemical exports, for instance, was more than double that of passenger cars.)

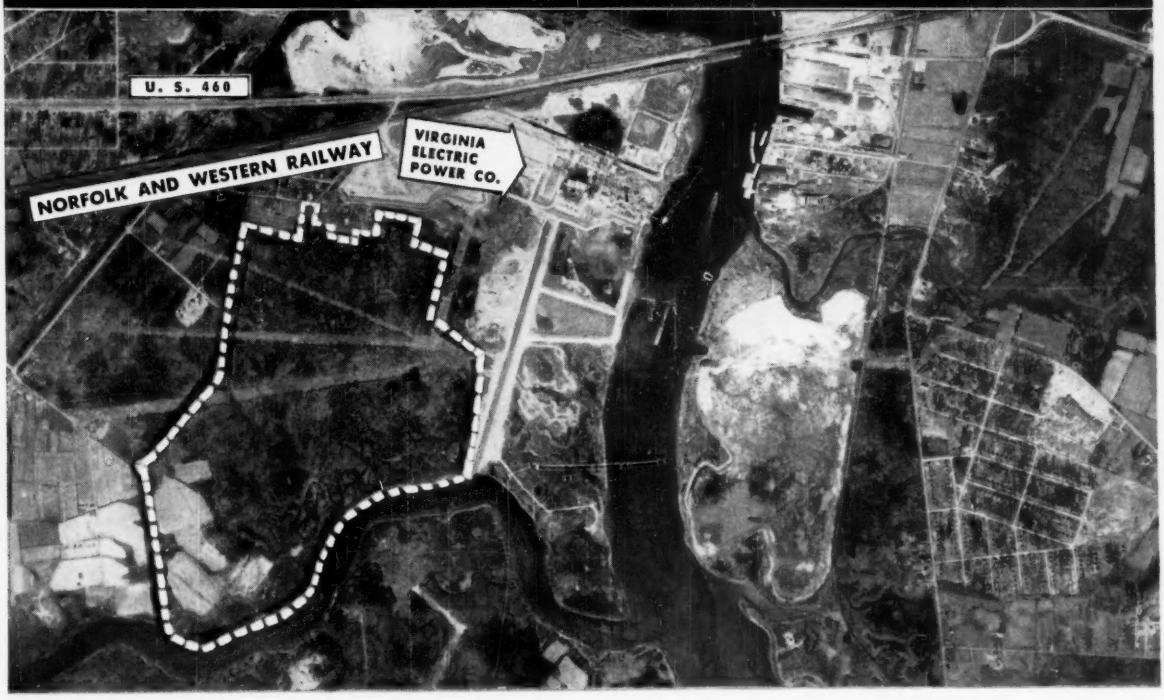
The keen competition for world markets did result in price reductions in most lines; British companies reportedly accepted very low profit margins to maintain their position in foreign markets.

Inorganic and simple organic chemical exports racked up the largest increase, some £6 million, while plastic materials exports rose about £4 million. Exports of drugs and medicines inched up over '55 to hit a peak of £35.9 million in '56; antibiotics, produced in many cases under American licenses or by U. S. subsidiaries, accounted for about 10% of the total value.

Chemical exports to the U.S. last

WATERFRONT PLANT SITE

195 Acres—6 miles from downtown Norfolk



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Here is a plant site that is custom-made for chemical processing and heavy manufacturing industries. It has a 4,200 foot frontage on Deep Creek, an estuary of the deep-draft Elizabeth River, which empties into Hampton Roads just six miles away.

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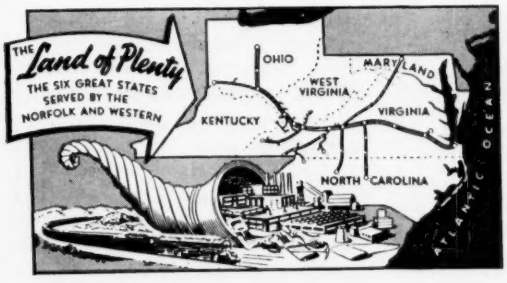

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year hiked up about 13% over those in '55, and exports to European outlets also increased. Most significant rise, though, was in shipments to Brazil; these soared from about £310,000 in '55 to more than £2 million last year.

Imports Teetering? Total value of imports of chemicals and allied products skittered during '56 to £107.4 million from the previous year's £112.1 million. As the table on pp. 80-81 indicates, of 46 principal items, value of shipments of 27 was lower in '56, compared with '55, while 19 were higher.

The U.S. remained the leading supplier last year, although U.S. shipments to Britain dropped some £4 million from £26 million to £21.9 million. Leading products included potassium chloride, channel-type carbon blacks, styrene monomer, vinyl acetate monomer and plastics in unfinished forms.

And with Britain's chemical industry ready to shell out nearly 25% more for expansion this year than it did in '56, it's apparent that the country's impressive list of imports will again be trimmed—something U.S. and other world marketers will have to live with in the years ahead.

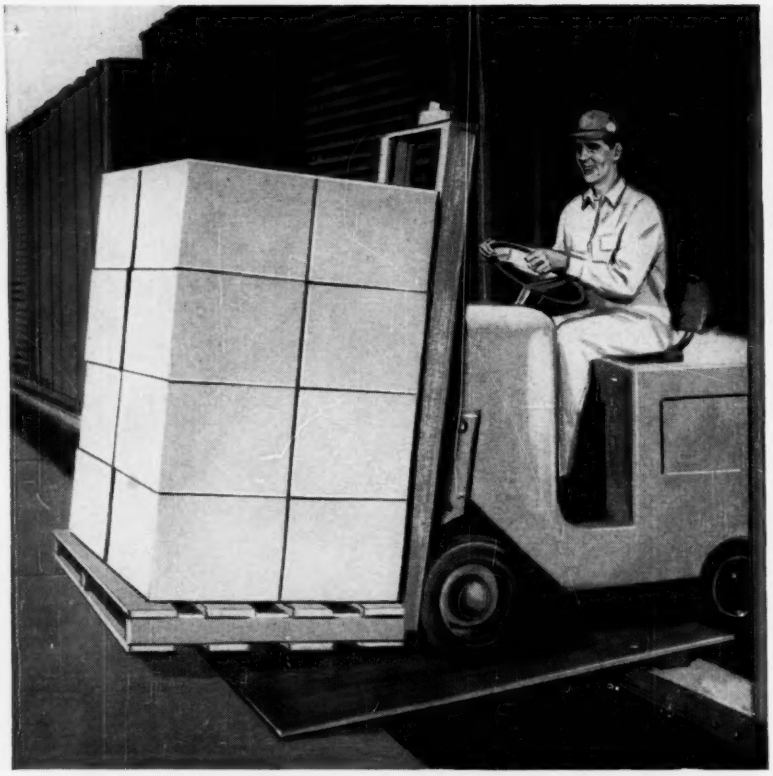
Vanadium Vendue

The Atomic Energy Commission at Grand Junction, Colo., is calling for bids, to be opened July 5, on the sale of 500,000 lbs. of fused vanadium pentoxide.

It's the first portion of approximately 4.5 million lbs. of surplus pentoxide that will be sold in half-million-pound lots at 4- to 8-month intervals.

AEC worked with the Commerce Dept.'s Business & Defense Services Administration to determine what amounts of material could be offered, and at what intervals sales could be made without upsetting the market.

AEC intends to sell the concentrate —packed in 30-gal. steel drums— at a price bearing a reasonable relationship to the present market price for carload sales, which have been averaging about $1.22/lb., f.o.b. Grand Junction. This average price does not include sales under term contracts (which prices have been averaging lower) and for less than carload lots (averaging higher).



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"Ludox" colloidal silica, one of Du Pont's most versatile chemicals, is performing another vital service for industry.

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That is why the present tasks of our colleges and universities are of vital concern to *every* American. These institutions are doing their utmost to raise their teaching standards, to meet the steadily rising pressure for enrollment, and provide the healthy educational climate in which great ideas may flourish.

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PRODUCT	DESCRIPTION	Primary Amine Content (%)	Amine Number*	Iodine Value
Alamine 21	Primary coco amine	87 min.	250 min.	16 max.
Alamine 21D	Distilled primary coco amine	97 min.	272 min.	16 max.
Alamine 26	Primary tallow amine	87 min.	192 min.	35 min.
Alamine 26D	Distilled primary tallow amine	97 min.	207 min.	35 min.
Alamine H26	Primary hydrogenated tallow amine	87 min.	192 min.	6 max.
Alamine H26D	Distilled primary hydrogenated tallow amine	97 min.	207 min.	6 max.
Alamine 7	Primary stearylamine	87 min.	186 min.	6 max.
Alamine 7D	Distilled primary stearylamine	97 min.	202 min.	6 max.
Alamine 46	Mixed amines	60 min.	150 min.	20 min.
		Secondary Amine Content (%)		
Alamine 221	Secondary coco amine	85 min.	—	16 max.
Alamine H226	Secondary hydrogenated tallow amine	85 min.	—	10 max.

*mg KOH equivalent to 1 gram of amine

FATTY TRIMETHYLENE DIAMINES

General Mills Diams • SPECIFICATIONS

PRODUCT	DESCRIPTION	Amine Number	Water Content	Melting Range
Diam 21	N-coco trimethylene diamine	375 min.	2% max.	20-25° C.
Diam 26	N-tallow trimethylene diamine	285 min.	2% max.	43-47° C.

PRIMARY FATTY AMINE ACETATES

General Mills Alamacs • SPECIFICATIONS

PRODUCT	DESCRIPTION	Amine Value	Percent Neutralization	Iodine Value
Alamac 21	Primary coco amine acetate	191 min.	97-103	10 max.
Alamac 26	Primary tallow amine acetate	154 min.	97-103	28 min.
Alamac 26D	Distilled primary tallow amine acetate	164 min.	97-103	28 min.
Alamac H26	Primary hydrogenated tallow amine acetate	152 min.	97-103	5 max.
Alamac H26D	Distilled primary hydrogenated tallow amine acetate	162 min.	97-103	5 max.
Alamac 7D	Distilled primary stearylamine acetate	159 min.	97-103	5 max.

FATTY QUATERNARIES

General Mills Aliquats • SPECIFICATIONS

PRODUCT	DESCRIPTION	Percent Quaternary Ammonia Compound	Percent Sodium Chloride	pH
Aliquat 26	Monotallow trimethyl ammonium chloride	48-52	1.0 max.	9 max.
Aliquat 221	Dicoco dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat H226	Dihydrogenated tallow dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 400	1:1 mixture Aliquats 26 and 221	48-52	1.0 max.	9 max.

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Market Newsletter

CHEMICAL WEEK
June 29, 1957

Price news on nonferrous metals continues to break with Bren gun rapidity—and break is the correct word. Copper and zinc tags were reduced late last week, the latter suffering the fourth in a series of drops that have brought zinc prices down 3¢/lb. since early last month. Prime Western material (at press time) can be had for 10½¢/lb. (East St. Louis) from custom smelters.

The copper reduction, a slashing 2¾¢/lb., posted almost simultaneously by major producers Phelps Dodge and Kennecott Copper (and followed later by Anaconda), set the metal's delivered price at 29¼¢/lb., lowest quote in more than four years. The producers' action was quickly emulated by custom smelters who chipped 1¢/lb. off their previous 30¢ price. The move keeps custom smelters' material at lower than producers' copper prices, but the spread is narrower than it was.

Along with Anaconda's price announcement was word that the company would trim copper production next week at its Yerington mine (Weed Heights, Nev.) It's a 16% cutback, will reduce output by some 416 tons/month. Earlier this year, Anaconda cut its Montana production by about 2,000 tons/month. Reason for the cutbacks: hope of bringing copper supply more in line with slipping demand.

•

As was to be expected, the softening metals market has pressured prices on some chemical derivatives. Two of the major copper chemicals—sulfate and carbonate—are down substantially, while zinc dust tags were snipped ½¢/lb.

Reductions in copper sulfate amount to between 70¢ and $1.40/cwt. (depending on copper content); c.l. price for the material in crystal form is now $12.20/cwt., while the carbonate is down 1¼¢/lb., to the basis of 32¾¢/lb.

•

Growing interest in high-energy fuel programs is spilling over, understandably, into the field of related raw materials—borohydrides, for example. Significant price cuts on potassium borohydrides, which may greatly widen its use, especially as a reducing agent, have just been posted by Metal Hydrides (Beverly, Mass.).

Though the details have not been spelled out, the company reportedly will furnish sodium borohydrides for Olin Mathieson's alkyl borane fuel plant (*CW Technology Newsletter, Aug. 11, '56*). And potassium borohydride is a step further—an economical one—in the borohydride manufacturing process (*CW, May 26, '56, p. 38.*).

In view of the increasing production of sodium borohydride, Metal Hydrides will also up output of the potassium material, sell the latter at these lower price ranges: in 10,000-lb. lots or more (deliveries

may be spread over a year), $13.50/lb.; for less than 100-lb. quantities, $21/lb. Comparable reductions ($1-$1.25/lb.) will be made on intermediate-size orders.

But not all prices are going down. Drum tags on pentachlorophenol, the wood preservative now encroaching on creosote's traditional outlets (*CW, Nov. 10, '56, p. 76*), are up 1¢/lb. The increase, initiated last week by Reichhold Chemicals, is effective immediately on spot purchases, July 1 on contract orders. New price: 23¢/lb.

The drum price increase, explains RCI, will enable the company to "maintain current prices for bag-packed pentachlorophenol at 22¢ (carload or truckload) and 23½¢/lb. (l.c.l.).

The material was produced initially by RCI in the Northwest primarily for the lumber trade, and now there's a hint that the company will soon expand pentachlorophenol operations with another plant to satisfy growing demands in Midwest and Southeast markets.

•

How good were the Paley Commission forecasts on synthetic organic chemicals? That question, asked of Grace Chemical Research and Development (a division of W. R. Grace & Co.) a while back, has now been answered. The reply indicates that the commission used a slightly cloudy crystal ball in making its predictions for 1955.

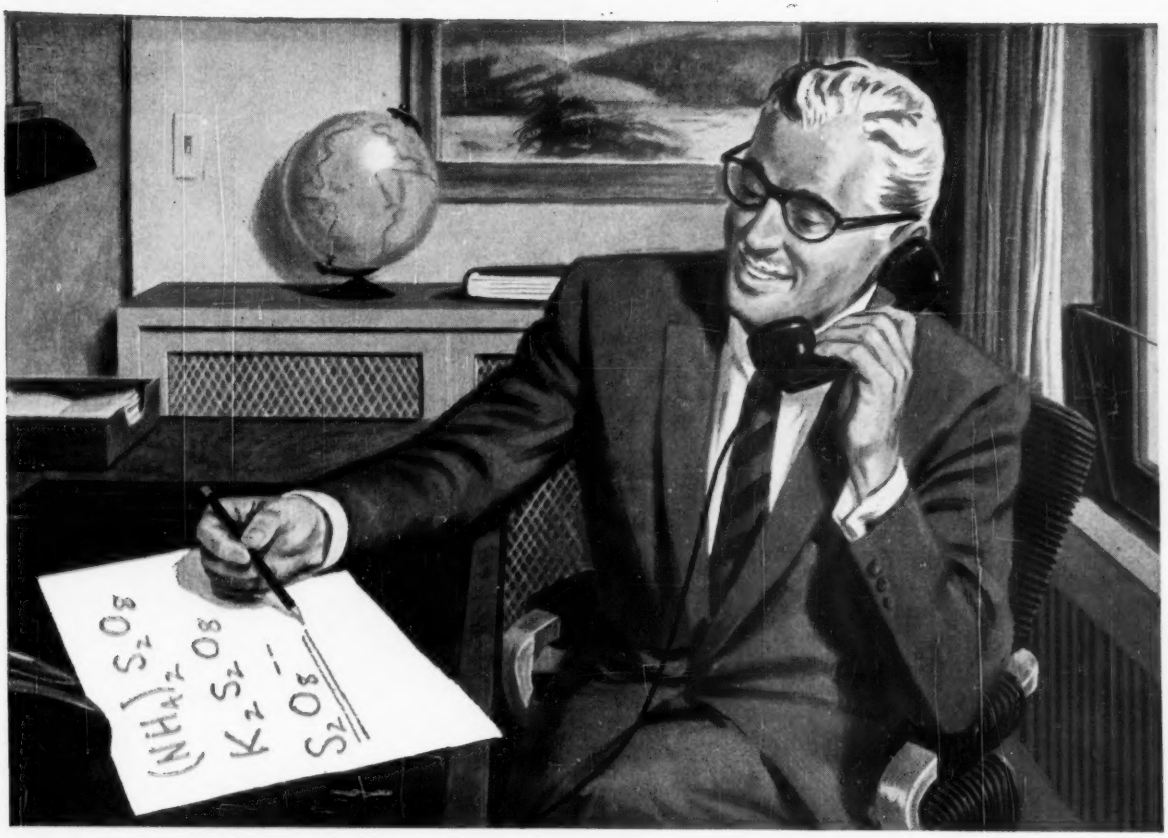
Only about a third of 41 forecasts (all Grace surveyed) for '55 were within 15%, plus or minus, of actual '55 figures; about two-thirds of the prognostications came within 30%, either way, of actual figures. Three groups were hit on the button—non-motor-grade benzene (308 million gal.); toluene from coal (42 million gal.); and vinyl resins (about 700 million lbs.).

Forecasts that were way off included benzene hexachloride, 304% over '55's actual 56-million-lbs. production; styrene copolymers, 264% too high—540 million lbs. forecast vs. the actual 205 million; naphthenic acids, 206% too high—35 million lbs. predicted, 17 million actual.

SELECTED PRICE CHANGES — WEEK ENDING JUNE 24, 1957

DOWN

	Change	New Price
Copper metal, electrolytic, dlvd., Valley basis, lb.	$0.0275	$0.2925
Copper sulfate, CP, gran., dms., wks., lb.	0.007	0.1910
Copper sulfate, cryst., 99%, bgs., c.l., wks., cwt.	0.70	12.20
Copper sulfate, monohydrated, 35%,dms., c.l., wks., cwt.	0.80	21.70
Copper sulfate, tribasic, distributors, bgs., c.l., same basis, cwt.	1.40	26.60
Zinc dust, pigment, bbls., lb.	0.01	0.1450



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SILACO'S HAL ELLISON (right): On mirrors, printed circuits, electrotypes. . .

Metal Cladding Process Adds New Luster

A versatile new process for deposition of ultrafine-grain films of silver or copper has suddenly blossomed into a substantial money-maker for a Chicago specialties firm, Silaco Chemical Co. Useful in the manufacture of mirrors, ornamental ware (e.g., bookends, lamps) and already widely accepted by producers of electrotypes, the patent-applied-for process is also finding increasing application in the manufacture of printed circuits.

Accounting for the success of the process, Silaco says, is its ability to produce films—on virtually any surface, including wax—with better adhesion and finer grain than that of conventionally produced films. But Silaco refuses to give complete details on how it achieves these advantages, other than to say they're inherent in finishes produced by its ultraviolet catalyzed coating system.

Versatile, Cheap: The new system is easy to install. To start from scratch costs about $500 (for booth, two spray guns, three aspirator bottles). To convert a conventional system to Silaco's requires only the purchase of the special, double-nozzle spray gun (about $125).

Mirrored Market: At present, mirrors, ornamental ware, and electrotypes (in that order) are the main targets for silver films. For these, two solutions are used, an ammonical silver (plus the uv.-catalyzed organic compound), and a colloidal copper made from conventional copper salts by special techniques. The copper is a reducing agent, said to be superior to such materials as glucose or Rochelle salts.

The solutions, sold as concentrate half-pint "units", are diluted before use, then applied through the double-headed nozzle. Two units, one of each material, will cover 1,100-1,200 sq. ft., depending on film thickness (usually about 1/10 mil), at a cost of 2.5-5¢/sq. ft. Solutions can be left in the process equipment between applications.

Although rear surfaces of mirrors show a light copper cast, Silaco says, the front side is as bright as that of conventional mirrors. And illustrating the improved adhesion of the film: the cellulose tape test won't remove any coating, and the film will withstand a 300-hour salt-spray test (Mirror Institute tests call for 100-hour salt-spray tests). The superior adhesion is attributed to the copper content of the film.

The durability of the Silaco film and its mirrorlike luster are the main attractions the new process has for houseware makers.

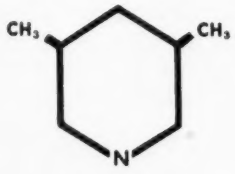
In the electrotype industry, the sought-after advantages are: good penetration by the fine-grain material into crevices, and the near-elimination of blisters, pinholes and pullaways. Applied on electrotypes, the double unit of solution coating covers 800-900 sq. ft.

Copper's Role: Limited stability of the copper solution (three days) precludes selling of premixed units. Instead, Silaco sells the formula direct

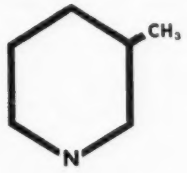
Reilly reports TO INDUSTRY

From the Research and Development Division, Reilly Tar & Chemical Corporation
Merchants Bank Bldg., Indianapolis 4, Ind.

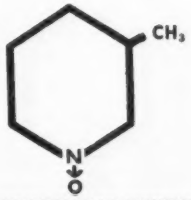
We have received a number of requests for pyridines having substituents in the 3- position. As a service to our fellow researchers, we have prepared a list of 3- substituted pyridines available from Reilly. Most of these are available only in research quantities, but we can make any of them on a large scale.



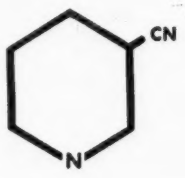
3, 5-LUTIDINE



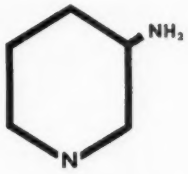
3-PICOLINE



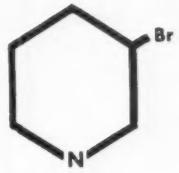
3-PICOLINE-N-OXIDE



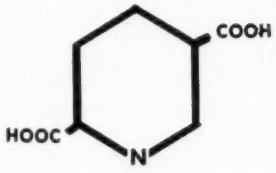
3-CYANOPYRIDINE



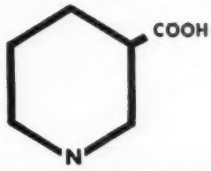
3-AMINOPYRIDINE



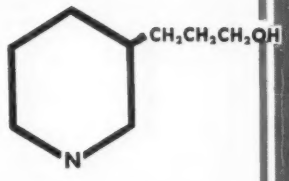
3-BROMOPYRIDINE



ISOCINCHOMERONIC ACID



NICOTINIC ACID



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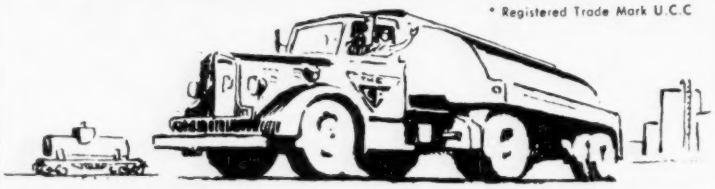

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(for a flat fee, not a license royalty) to users, and provides technical service. Some 12 companies now use the copper solution to give protective backing to the silver coat of mirrors, thereby improving its weathering properties.

Probably the most important use of copper coating right now is in the manufacture of printed circuits. For this, colloidal copper salts with organic compound and a special reducing agent are applied through the double-headed spray gun. Main advantage of the new process is the spray's ability to get into the solder connection holes of the phenolic backing-board. This isn't possible when copper foil is laminated to the board.

After the deposition of the copper film, the printed-circuit maker masks off the circuit desired, removes unwanted copper with ammonium persulfate, rinses the board, then puts it into the plating bath to build up a deposit.

An interesting future for the copper process may be in the electrotype field. Only preliminary work has been done, but tests look good. By using copper intead of silver on electrotypes, costs might be cut by 75%, says Silaco.

Encouraged by its recent sales record, Silaco feels it has a winner in its new process. In the last few months of '56, the firm had sales of only $12,000—but it expects the '57 gross to be about $75,000. It figures the potential market in the electrotype field alone is $250,000, sees sales in other industries pushing the total to more than $1 million as the process catches on.

Add Two Waxes

Two easily emulsifiable industrial waxes, called Aerok E-24 and E-600, have just been made available to U.S. wax users by Aerogon Chemical Industries (New York). Derived from high-molecular-weight hydrocarbon polymers, they have acid values of 40 and 60, respectively.

Aerok E-24 makes higher viscosity emulsifiable polyethylene much easier to control and disperse—and with a greatly reduced fatty acid content. Aerok E-600 (which can be dispersed with only ammonia) offers good possibilities in waterproofing emulsions for paper, textiles, other materials.

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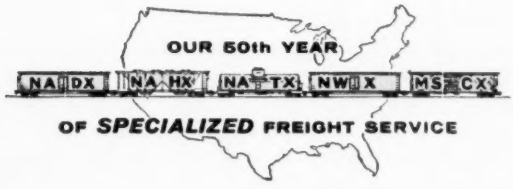

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Nelson, Tikka Sahib, MarElia: The dog had fleas; the admen itched to start a business.

Two Men Build Specialties Firm From Pet Idea

MY ADVICE to the little man with a new product idea is to get rid of it, sell it to somebody else," says Alex MarElia, part owner of Guardian Industries, Inc. MarElia and Guardian's cofounder, Paul Nelson, have ignored this advice themselves. They took a single new product idea and built it into a potential $1-million pet specialties business.

MarElia, a former advertising account executive, and Nelson, one of his clients, had often indulged in what they call "the adman's favorite pastime": daydreaming about some day going into business for themselves. They wanted to be able to work out campaigns, packaging, distribution problems to suit themselves, without having to get a string of o.k.'s from the chain of command. But in all the years they talked about it they never got down to specific products.

One day, MarElia, who figures the best way to get ahead in the world is to meet as many people each day as possible, met a man who had invented a dog collar that, he said, would keep a dog flea-free. MarElia, a dog owner himself (he has two afghan hounds), took home one of the collars and tried it. The device seemed to work, and the inventor seemed anxious to sell out—he'd been selling only 200 of the collars a year. Sensing a windfall, particularly in view of the fact that there was a terrific refill business in the insecticide the collar contained, MarElia and Nelson bought the rights—wondered what to do next.

They decided that their opening gambit should be a direct-mail campaign based on state lists of dog-license holders. They would start with owners in the South and move northward (it being winter at the time). In the course of preparing this big onslaught, they uncovered two interesting facts.

- States do not sell lists of dog-license holders.
- People do not buy insecticides in the wintertime.

They were able to find out the latter because they got some distribution in department stores. By this time they'd invested houses, cars and everything else in the business, quit their jobs, seemingly for nought. However, the weather warmed up, thawing out sales, and orders began coming in, bringing necessary capital.

Since then the business has increased at a phenomenal rate. At the end of their first seven months (in 1955), they had grossed about $150,000. The next year it was $250,000. Thanks to a number of new products, it is expected to be four times that this year, or about $1 million worth of sales.

Much of their success they attribute to having put some glamor into the pet industry, chiefly through elaborate packaging. "The pet supply business has been underated too long," MarElia says, figuring that the estimated $25 million now spent on dog grooming aids is but an indication of the real market.

Following through on its beliefs, Guardian has just introduced three new aerosol products: a parasite-killer mist, a lanolin-foam shampoo, and a parasite-killer

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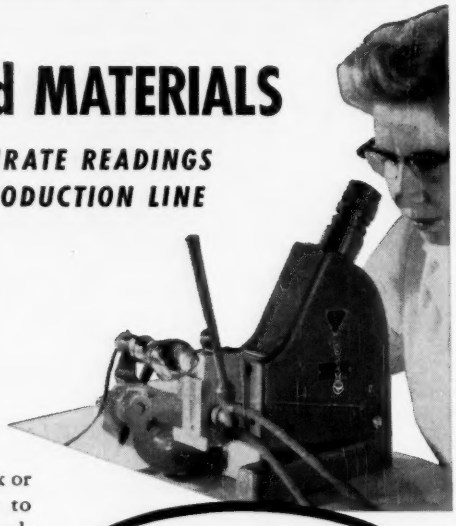

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powder (not an aerosol but packaged in an aerosol can). Most striking feature of the new line is the packaging, which includes a gold cap in the shape of a dog's head (12 different caps to represent America's 12 favorite breeds).

MarElia and Nelson believe that almost all aerosol cans are homely, think that a pretty package is important. Reason: if a package is good-looking enough to be left on top of a kitchen counter, rather than underneath, it will get used more often.

Afghan Presentation: To get the necessary distribution, Nelson and MarElia canvassed the stores themselves, often accompanied by an afghan named Tikka Sahib (Persian for crown prince—MarElia's grandfather came over from Persia in 1906).

"Having that stupid dog attracted more attention than anything else we could have done," MarElia says. It not only attracted crowds in department stores, it helped impress store buyers, and even got publicity space in newspapers. The original Tikka Sahib died and has been replaced by another afghan of the same name, which is billed as "the dog that built a $1-million business."

Tikka Sahib also appears in all of the company's ads, of which there are many. So far, the company has spent more on advertising than on new products—as might be guessed, considering its founders' backgrounds. Most of the advertising has been of the cooperative nature, where the retailer pays part of the cost.

In approaching department stores, MarElia and Nelson insist upon getting space on the ground floor rather than in pet departments, which are usually hidden on one of the upper floors.

Mailing to Mailers: Guardian has a healthy business through a number of mail-order houses. Early in its history, the company bought a mailing list of all the direct-mail houses in the country—about 2,500. Each was sent a sample dog collar and an invitation to buy.

Variety stores — five-and-dimes— are Guardian's preferred outlet, however. MarElia believes that these stores are lending more prestige to the pet industry than any other outlet.

Dog Caps: Not strictly a marketing

News from
National Carbon Company
Division of Union Carbide Corporation · 30 East 42nd Street, New York 17, N. Y.
Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. IN CANADA: Union Carbide Canada Limited, Toronto

PROCESS EQUIPMENT BRIEFS

New Data Sheets Give Product Specifications on "Columbia" Brand Activated Carbon

Designed to facilitate selection of proper type and grade of "Columbia" Activated Carbon in gas purification, gas separation, air conditioning, and catalyst applications. Includes product description, typical applications, properties, screen analyses and pressure drop curves. Request supplement to **Catalog Section S-6450.**

Technical Information on "National" Carbon Brick Now Includes Corrosion Resistance Tables

Cover use of "National" Carbon Brick for lining tanks, reactors and similar process vessels containing corrosive liquids or gases. Photograph above shows "National" Carbon Brick linings and "Karbate" Plate Type Heat Exchangers in nitric-hydrofluoric acid stainless steel pickling tanks.
Catalog Section S-6215

HCl Storage—Loading Facilities Use "Karbate" Centrifugal Pumps

"Karbate" Centrifugal Pumps load and unload commercial strengths of hydrochloric acid at tank farms. Pump capacities up to 1500 gallons per minute at heads up to 125 feet cover wide range of loading requirements.
Catalog Section S-7250

"KARBATE" Impervious Graphite Vital to Increasing HCl Production

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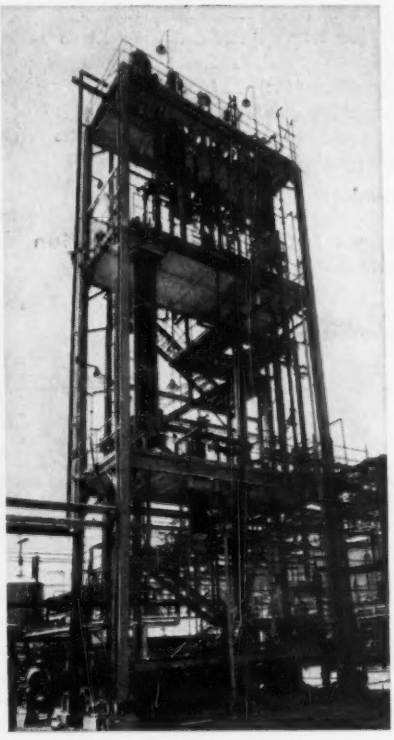
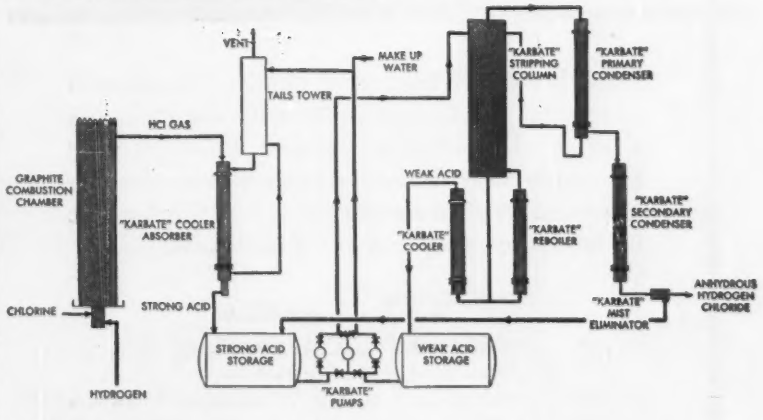


Process improvements made possible by National Carbon's introduction of impervious graphite have established hydrochloric acid and anhydrous hydrogen chloride as major industrial chemicals. Today, "Karbate" impervious graphite equipment is used in all HCl production processes.

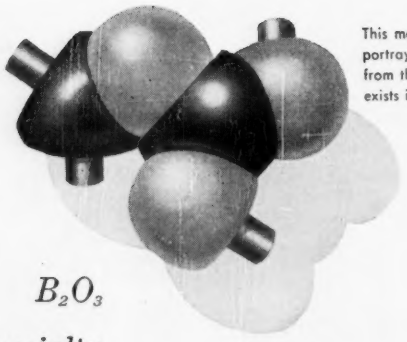
Photograph at left shows typical plant equipment producing anhydrous hydrogen chloride from by-product HCl. Flow sheet below emphasizes the role of "Karbate" impervious graphite in this operation; the "National" Graphite Combustion Chamber shown is frequently used to produce raw HCl gas by combustion of hydrogen and chlorine.

The durable construction of "Karbate" shell and tube heat exchangers, towers and centrifugal pumps is important to the design and continued economy of all types of HCl processes. A wide range of items available from stock at moderate cost. For details on "Karbate" equipment in HCl production, request **Catalog Section S-7460 NL.**



NATIONAL TRADE-MARK

The terms "Karbate", "Columbia", "National" and the "N" and Shield Device are trade-marks of Union Carbide Corporation



This molecular model portrays a fragment from the network which exists in B_2O_3

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outfit, Guardian does all its own manufacturing. It has just installed an aerosol line to fill its new set of products. Although constantly plagued by having more ideas and ways of spending money than they have money available, the two men decided that setting up their own filling line was justifiable because of the way it broadened their manufacturing base. Impressed by aerosol growth figures, Guardian plans to grow through aerosols of all types rather than sticking strictly to pet products. Already in the works are several nonpet (but so far undisclosed) new products.

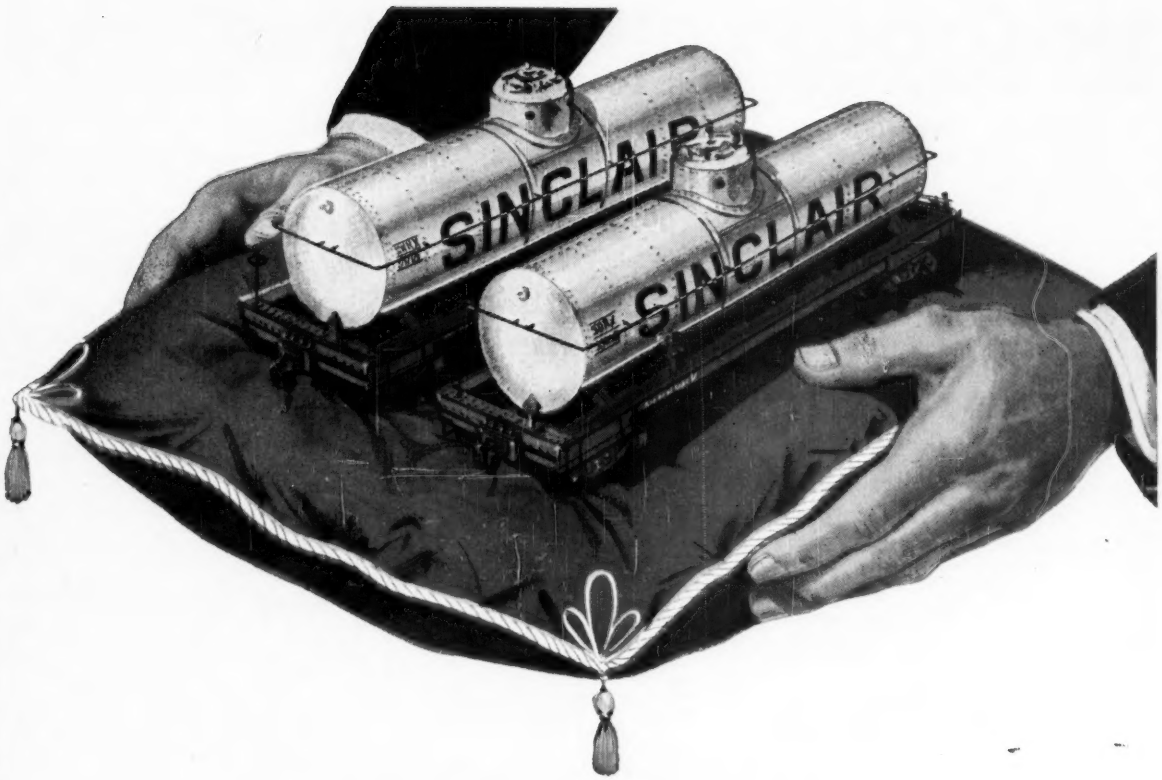
Although neither Nelson nor MarElia is a chemist, both are mechanically inclined—they worked out technical problems by hit-and-miss methods. For example, when they decided to use plastic dog heads on their new series of aerosol products, they had no idea how to go about making them. First, they tried molding a head from dime-store dog statues, using a clay modeling kit, but the finished product looked too cheap. They eventually bought $150 worth of Royal Doulton china dogs as patterns for the molds.

In developing the products themselves, they got help from suppliers and the U. S. Dept. of Agriculture. Guardian Industries and USDA first met when USDA seized some mislabeled stock—Guardian had no idea that the law requires listing ingredients of an insecticide on the label. After that was all straightened out, however, USDA became one of the firm's valuable sources of technical information. Although the business seems to be running fairly smoothly now, the two entrepreneurs are a long way from being out of problems.

So far, the company has concentrated on 100 top markets, picked from a list of the top markets for electric appliances (MarElia used to have an appliance account during his ad agency days).

Dealers in these markets are sent almost every kind of dealer aid—all, like the company's packaging, calculated to appeal to women—who buy over 85% of all pet supplies.

Guardian has managed to appeal to women, and make a place for itself in the world; but for those who would follow in its footsteps, the company's founders advise caution. Starting your own business, they say, isn't as much fun as it seems to be.



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PRODUCTS

Tank-Type Stripper: Wagner Bros. (Detroit) has introduced a new tank-type accelerated alkaline paint remover called Benchmark F-195. It's claimed to be fast-acting, can be used to strip ferrous metals of practically all paints, including lacquers and enamels. It's not recommended for melamine and epoxy resin paints. Recommended concentration is 8-16 oz. of remover/gal. of water.

•

Give a Little: Now available from A. C. Horn Co., Inc., subsidiary of Sun Chemical Corp. (Long Island City, N.Y.), is an expansion joint and caulking compound, which is said to elongate 325% through the normal temperature range of 70-80 F.

•

Antistatic Buffer: A scratch-free, antistatic, buffing compound for use with all types of plastics and containing a special antistatic ingredient is the latest product of Hanson-Van Winkle-Munning Co. (Matawan, N.J.). Called PC-52, the compound is said to eliminate need for a destaticizing solution in the finishing of themosetting phenolic as well as acetate, styrene and acrylic products.

•

Clear Superiority: Pliolite VT, a new coating resin soluble in mineral spirits, has been developed as a solution binder for coatings by Goodyear's Chemical Division. Suggested for use in traffic paint, paper coating, adhesives, printing inks and related applications, the new resin forms films that show excellent clarity, according to the company. Resin solution has a Gardner Color of less than one.

•

Keeps Copying: A West German paint and ink producer says it has developed a carbon paper, Ultracopy, which does not smear, does not adhere, delivers wipe-resistant copies, lasts much longer than standard carbon papers. The maker is Guenther Wagner (Hanover).

•

Finger of Elixer: Palo Laboratories (New York) has developed a fingertip fluid dispenser that can deliver amounts of 1 milliliter up to a pint a minute. It is said to prevent loss or contamination of pharmaceuticals, sterile solutions, corrosive or dangerous chemicals.

CHEMICAL WEEK • ADVERTISERS INDEX
JUNE 29, 1957

ACE GLASS INC. 6
Agency—Ray Hawley, Adv.

AIR REDUCTION CHEMICAL CO. 97
Agency—G. M. Basford Co.

ALLIED CHEMICAL & DYE CORP. NITROGEN DIV. 14
Agency—G. M. Basford Co.

ALUMINUM CO. OF AMERICA 11
Agency—Ketchum, MacLeod & Grove, Inc.

AMERICAN CYANAMID CO. 57
Agency—Hazard Adv., Inc.

AMERICAN MINERAL SPIRITS CO. 29
Agency—Leo Burnett Co.

ARCHER, DANIELS, MIDLAND CO. 76
Agency—The Bayless-Kerr Co.

RICHARD M. ARMSTRONG CO. 8
Agency—Ray Hawley Adv.

ATLAS POWDER CO. 16
Agency—Aitken Kynett Co.

AUTOMATIC SPRINKLER CORP. OF AMERICA 85
Agency—G. M. Basford Co.

BAKER & ADAMSON PRODUCTS GENERAL CHEMICAL DIV. ALLIED CHEMICAL & DYE CORP. ..... 3rd Cover
Agency—Atherton & Currier Inc.

BAUSCH & LOMB OPTICAL CO. 98
Agency—E. Wolff & Assoc.

BAKELITE CO. 39
Agency—J. M. Mathes, Inc.

BECCO CHEMICAL DIV. FOOD MACHINERY & CHEMICAL CORP. 89
Agency—John Mather Lupton, Inc.

BERKSHIRE CHEMICALS INC. 15
Agency—Molesworth Assoc.

BIRD MACHINE CO. 45
Agency—Walter B. Snow & Staff, Inc.

BLOCKSON CHEMICAL CO. 13
Agency—Wm. Balsam Adv.

BUFFALO FORGE CO. 79
Agency—Melvin F. Hall Co.

CARRIER-STEPHENS CO. 77

CHEMICAL CONSTRUCTION CORP. 7
Agency—Godwin Adv.

CHEMICAL SOLVENTS INC. THE C. P. .. 94

COSDEN PETROLEUM CORP. 75
Agency—Womack-Snelson, Adv.

DAVENPORT MACHINE & FOUNDRY CO. 94
Agency—Bawden Bros., Inc.

DAVISON CHEMICAL CO. DIV. OF W. R. GRACE & CO. 31
Agency—St. Georges & Keyes Inc.

DOW CHEMICAL CO. 59
Agency—MacManus, John & Adams Inc.

DU PONT de NEMOURS INC. E. I. GRASSELLI DIV. 84
Agency—Batten, Barton, Durstine & Osborn Inc.

DUREZ PLASTICS DIV. HOOKER ELECTROCHEMICAL CO. 34
Agency—Comstock & Co.

EASTERN STATES CHEMICAL CORP. 55
Agency—Ruthrauff & Ryan, Inc.

EMERY INDUSTRIES, INC. 78
Agency—Ruthrauff & Ryan, Inc.

EL DORADO DIV. FOREMOST FOOD & CHEMICAL CORP. 12
Agency—Sidney Garfield & Assoc.

ETHYL CORP. 19
Agency—H. B. Humphrey, Alley & Richards

EVANS RESEARCH & DEVELOPMENT CORP. 30
Agency—Ritter, Sanford & Price, Inc.

GENERAL AMERICAN TRANSPORTATION CORP. AIRSLIDE CARS DIV. 51
Agency—Edward H. Weiss & Co.

GENERAL MILLS, INC. 86
Agency—Knox Reeves Adv. Inc.

HALL CO. THE C. P. 68
Agency—Cruttenden Adv.

HARSHAW CHEMICAL CO. THE 27

HERCULES POWDER CO. 42
Agency—Fuller & Smith & Ross, Inc.

KOPPERS CO. INC. 74
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.

MAAS & CO. A. R. 66
Agency—Heintz & Co., Inc.

MERCK & CO. INC. 82
Agency—Charles W. Hoyt Co. Inc.

MONSANTO CHEMICAL CO. 35
Agency—Gardner Adv. Co.

NATIONAL CARBON CO. 99
Agency—William Esty Co.

NATIONAL ENGINEERING CO. 38
Agency—Russell T. Gray, Inc.

NORFOLK & WESTERN RAILWAY 83
Agency—Houck & Co., Inc.

NORTH AMERICAN CAR CORP. 95
Agency—Doremus & Co., Adv.

OLIN MATHIESON CHEMICAL CORP. ..... 2nd Cover
Agency—Doyle, Kitchen & McCormack, Inc.

PENICK & CO. S. B. 69
Agency—James J. McMahon, Adv.

PERMUTIT CO. 20
Agency—Cunningham & Walsh Inc.

PFANSTIEHL LABS INC. 50
Agency—Frank C. Nahser, Inc.

PUBLICKER INDUSTRIES, INC. 90-91
Agency—Al Paul Lefton Co. Inc.

REILLY TAR 93
Agency—The House of J. Hayden Twiss

RELIANCE STEEL 67
Agency—Bond & Starr, Inc.

RHODIA INC. 98
Agency—The House of J. Hayden Twiss

ROHM & HAAS Co. 63
Agency—Arndt, Preston, Chapin, Lamb & Keen Inc.

SINDAR CORP. 100
Agency—Hazard Adv. Co.

SINCLAIR CHEMICALS, INC. 101
Agency—Morey, Humm & Warwick, Inc.

SOLVAY PROCESS DIV. ALLIED CHEMICAL & DYE CORP. 73
Agency—Atherton & Currier, Inc.

STANDARD OIL CO. 4-5
Agency—D'Arcy Adv. Co.

STAUFFER CHEMICAL CO. 37
Agency—John Mather Lupton Co.

STEARNS ROGER MFG. CO. 1
Agency—Mosher, Reimer Williamson Adv. Agency.

TRUBEK LABORATORIES, INC. THE 9
Agency—Ray Ellis, Adv.

UNION BAG-CAMP PAPER CORP. 36
Agency—Smith, Hagel & Knudsen, Inc.

UNION CARBIDE CHEM CO. DIV. OF UNION CARBIDE CORP. 2
Agency—J. M. Mathes, Inc.

UNITED STATES BORAX & CHEMICAL CORP. PACIFIC COAST BORAX CO. DIV. 100
Agency—Howard M. Irwin & Assoc.

U. S. RUBBER CO. 60
Agency—Fletcher D. Richards Inc.

VIRGINIA-CAROLINA CHEMICAL CORP. 32-33
Agency—Albert Sidney Noble Adv.

VITRO CORP. OF AMERICA 58
Agency—Molesworth Assoc.

VOGT MACHINE CO., THE HENRY 71
Agency—Farson, Huff & Northlich, Adv.

WALLACE & TIERNAN INC. 54
Agency—Branstater Assoc. Inc.

WITCO CHEMICAL CO. ..... 4th Cover
Agency—Hazard Adv. Co.

WYANDOTTE CHEMICAL CORP. ... 10, 40-41
Agency—Brooke, Smith, French & Dorrance Inc.

tracers SECTION

(Classified Advertising)

F. J. Eberle, Business Mgr.

CHEMICALS: Offered/Wanted 102

EMPLOYMENT 102

EQUIPMENT: Used/Surplus New For Sale 103

WANTED 103

MANAGEMENT SERVICES 103

SPECIAL SERVICES 103

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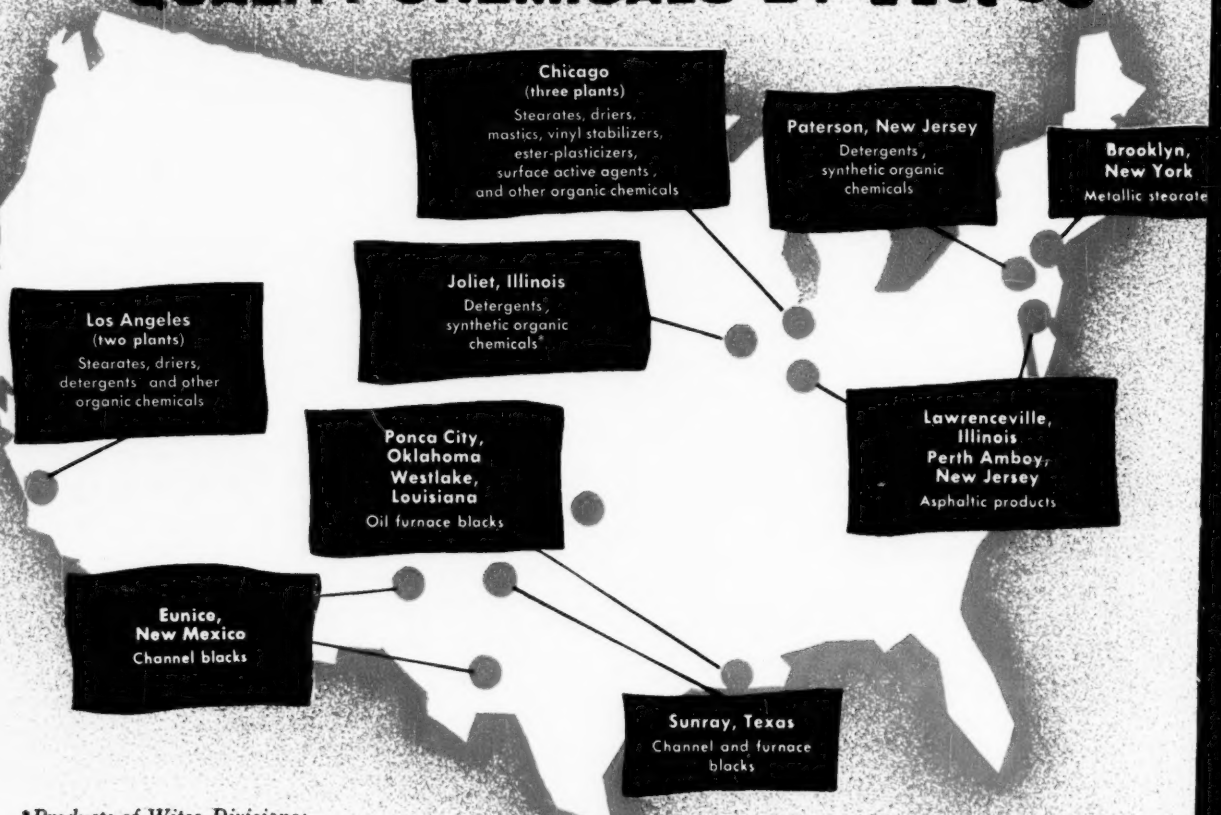

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